

Daily report

12-10-2020

Analysis and prediction of COVID-19 for EU-EFTA-UK and other countries

Situation report 140

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With the financial support of



and



Foreword

The present report aims to provide a comprehensive picture of the **pandemic situation of COVID-19** in the EU countries, and to be able to foresee the situation in the next coming days. We provide some figures and tables with several **indexes and indicators** as well as an **Analysis** section that discusses a specific topic related with the pandemic.

As for the predictions, we employ an **empirical model**, verified with the evolution of the number of confirmed cases in previous countries where the epidemic is close to conclude, including all provinces of China. The model does not pretend to interpret the causes of the evolution of the cases but to permit the **evaluation of the quality of control measures made in each state** and a **short-term prediction of trends**. Note, however, that the effects of the measures' control that start on a given day are not observed until approximately 7-14 days later.

We show an individual report with 8 graphs and a summary table with the main indicators for different countries and regions. We are adjusting the model to **countries and regions** with at least 4 days with more than 100 confirmed cases and a current load over 200 cases.

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These reports are funded by the European Commission (DG CONNECT, LC-01485746)

PJC and MC received funding from "la Caixa" Foundation (ID 100010434), under agreement LCF/PR/GN17/50300003; CP, DL, SA, MC, received funding from Ministerio de Ciencia, Innovación y Universidades and FEDER, with the project PGC2018-095456-B-I00;

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Situation and highlights

Global situation

EU+EFTA+UK lead in absolute terms the number of new cases daily. Globally, more than 81,000 new cases are diagnosed every day, which corresponds to about 15 new cases per 100,000 inhabitants. Then, we find India with almost 67,000 new cases daily, about 5 per 100,000 inhabitants, USA 53,000 cases and 16 per 10,000 inhabitants, and Brazil with about 27,000 cases and 13 per 100,000 inhabitants. We find that EU+EFTA+UK is indeed leading in absolute value when compared to other large populations and very close to doing so in new cases per 100,000 inhabitants, still behind the USA.

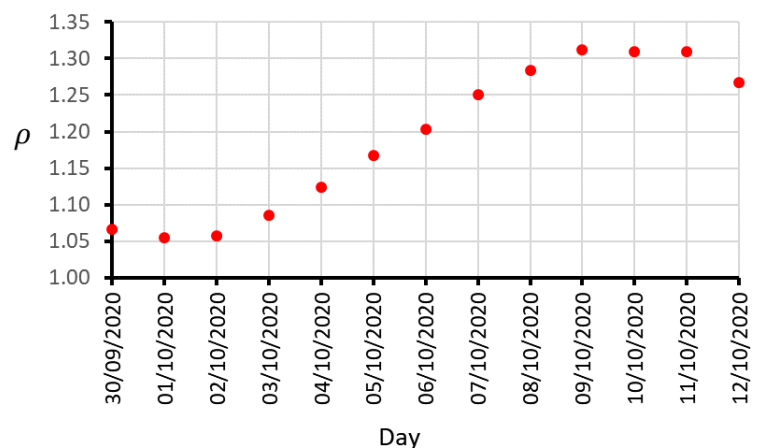
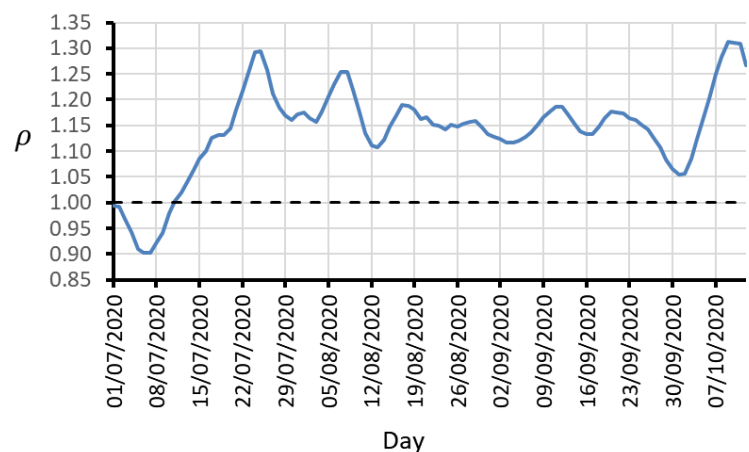
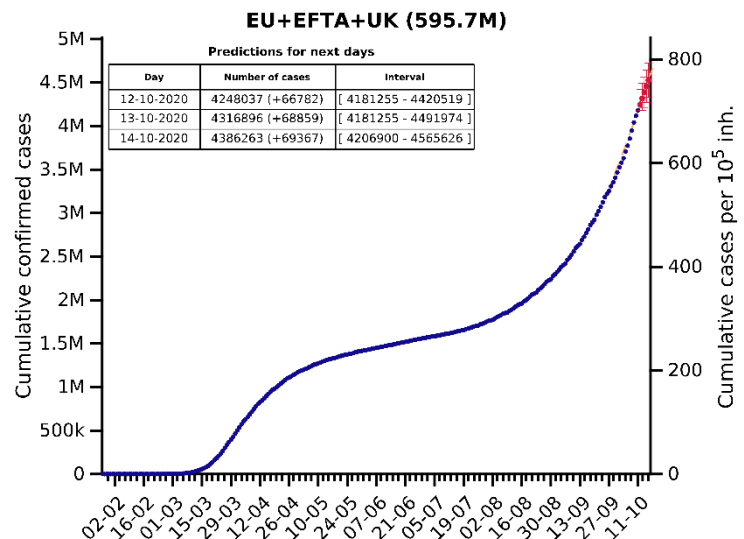
If we look at the evolution of the empiric reproduction number we find that the pandemic has been growing in the EU+EFTA+UK since mid-July. We currently have the highest growth rate in recent months.

Maybe we should not talk about a second wave but a second explosion. If ρ_t were constant, the cases would be growing exponentially. Nevertheless, ρ_t is growing, and new cases increase faster than in exponential growth. We could say that daily new cases are growing according to an exponential function where the exponent is approximately increasing linearly.

Community and uncontrolled transmission is present in many cities and regions. It is urgent to slow down this spread, i.e., it is urgent to reduce the ρ_t below 1. Accepting that we need to live with the pandemic, we need to be able to do so at levels of incidence that allow us to follow up through contact studies.

Highlights

- 11 countries have an A_{14} between 100 and 200 (high epidemiological risk) and 7 countries have an A_{14} greater than 200 (very high epidemiological risk).
- Countries with an A_{14} greater than 200 have a combined population of about 220 million, 42% of the EU+EFTA+UK.



- The three countries with highest A_{14} (Czech Republic, 490, Belgium, 393 and Netherlands, 367) also show a ρ_7 greater than 1.3 (Czech Republic, 1.6, Belgium, 1.3 and Netherlands, 1.4), therefore reaching EPG greater than 500.
- The list of countries with ρ_7 greater than 1.3 is huge. It also includes France, Iceland, UK, Slovakia, Malta, Romania, Luxemburg and Slovenia, among those with A_{14} greater than 150.

Situation and trends per country

Maps of current situation in EU countries. Colour scale is indicated in each legend.

- Cumulative incidence: total number of reported cases per 100,000 inhabitants
- A_{14} : Cumulative incidence last 14 days per 100,000 inhabitants (active cases)
- ρ_7 : Empiric reproduction number
- EPG: Effective Potential Growth ($EPG = A_{14} \cdot \rho_7$)

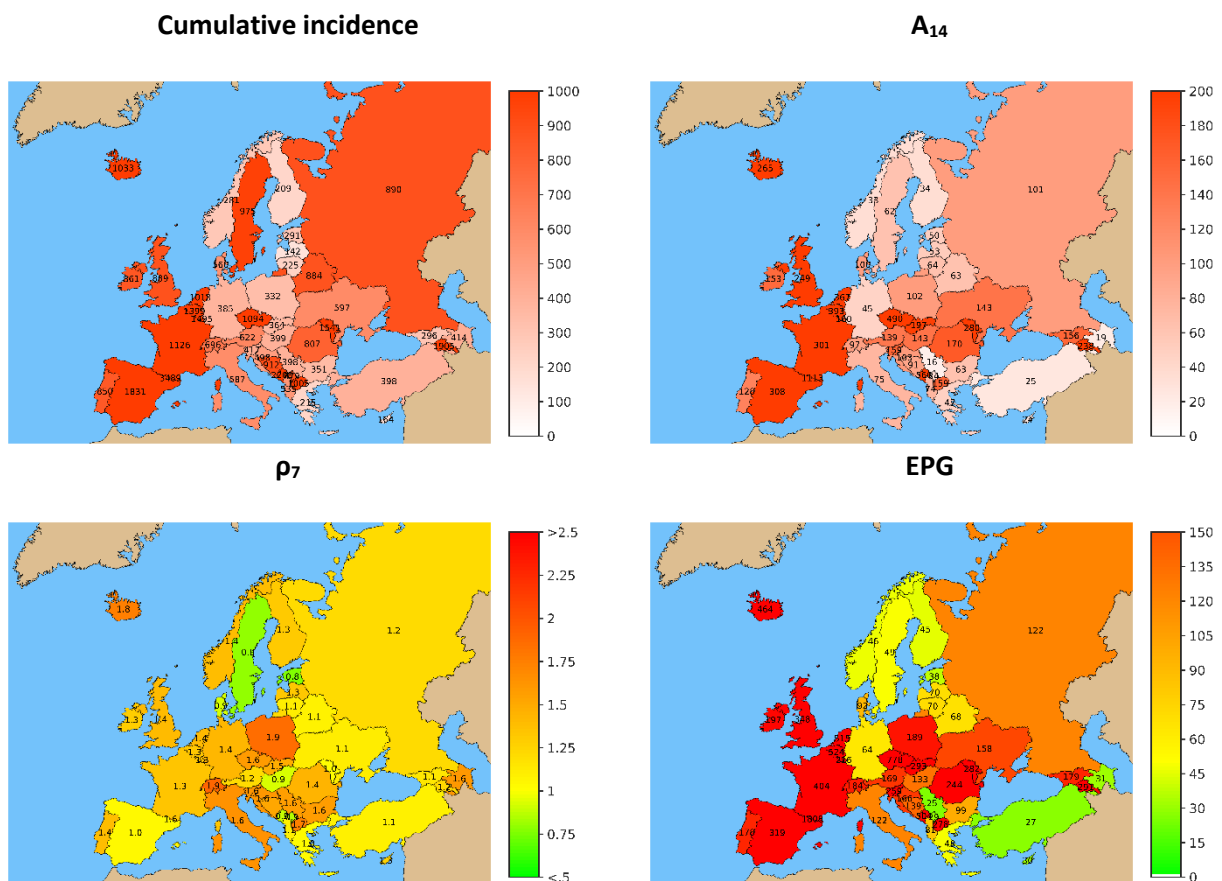


Table of current situation in EU countries. Colour scale is indicated in each legend.

| Country | Reported data | | | | | | Indexes | | |
|----------------|--|-----------------------------|-----------------------------------|------------------|---------------------------------|-------------------|----------------|--------------------|-------------------|
| | 14-day attack rate /10 ⁵ inh. | Active cases (last 14 days) | Attack rate /10 ⁵ inh. | Cumulative cases | Mortality /10 ⁵ inh. | Cumulative deaths | $\rho_7^{(1)}$ | EPG ⁽²⁾ | Biocom-Cov degree |
| Czech Republic | 395.8 | 42,383 | 940.9 | 100,757 | 8.1 | 869 | 1.50 | 596 | 9 |
| Netherlands | 307.0 | 52,596 | 908.3 | 155,630 | 38.1 | 6,522 | 1.33 | 409 | 9 |
| Spain | 306.5 | 144,115 | 1,803.9 | 848,324 | 69.5 | 32,688 | 0.92 | 282 | 9 |
| France | 267.2 | 174,401 | 1,029.0 | 671,638 | 49.8 | 32,521 | 1.14 | 304 | 9 |
| Belgium | 259.0 | 30,020 | 1,238.2 | 143,503 | 87.4 | 10,126 | 1.05 | 271 | 9 |
| Iceland | 221.2 | 755 | 957.4 | 3,267 | 2.9 | 10 | 1.71 | 379 | 9 |
| United Kingdom | 214.3 | 145,452 | 827.6 | 561,815 | 62.7 | 42,592 | 2.00 | 428 | 9 |
| Luxembourg | 169.5 | 1,061 | 1,472.7 | 9,219 | 20.6 | 129 | 1.36 | 230 | 9 |
| Slovakia | 148.3 | 8,097 | 288.0 | 15,726 | 1.0 | 57 | 1.28 | 190 | 8 |
| Romania | 143.7 | 27,646 | 757.4 | 145,700 | 27.3 | 5,247 | 1.23 | 177 | 8 |
| Malta | 137.7 | 608 | 794.0 | 3,506 | 9.3 | 41 | 1.84 | 253 | 8 |
| Hungary | 135.6 | 13,095 | 364.6 | 35,222 | 9.5 | 913 | 1.01 | 137 | 8 |
| Slovenia | 129.6 | 2,695 | 361.3 | 7,511 | 6.8 | 141 | 1.33 | 172 | 8 |
| Austria | 126.1 | 11,357 | 584.1 | 52,603 | 9.5 | 853 | 1.18 | 149 | 8 |
| Ireland | 123.4 | 6,092 | 811.8 | 40,086 | 36.8 | 1,817 | 1.20 | 148 | 8 |
| Portugal | 111.6 | 11,378 | 809.4 | 82,534 | 20.1 | 2,050 | 1.11 | 123 | 8 |
| Denmark | 107.7 | 6,240 | 537.9 | 31,156 | 11.5 | 665 | 0.85 | 91 | 7 |
| Switzerland | 83.8 | 7,253 | 678.8 | 58,745 | 20.7 | 1,790 | 1.70 | 142 | 8 |
| Croatia | 83.2 | 3,417 | 462.6 | 18,989 | 7.6 | 310 | 1.43 | 119 | 7 |
| Poland | 76.1 | 28,790 | 294.9 | 111,599 | 7.6 | 2,867 | 1.41 | 107 | 7 |
| Sweden | 64.3 | 6,494 | 965.7 | 97,532 | 58.3 | 5,892 | 1.00 | 64 | 6 |
| Lithuania | 57.1 | 1,555 | 206.6 | 5,625 | 3.7 | 102 | 1.06 | 61 | 6 |
| Italy | 56.4 | 34,075 | 559.7 | 338,398 | 59.7 | 36,083 | 1.38 | 78 | 6 |
| Bulgaria | 53.0 | 3,686 | 334.7 | 23,259 | 12.7 | 880 | 1.28 | 68 | 6 |
| Estonia | 51.6 | 684 | 283.4 | 3,760 | 5.1 | 67 | 0.85 | 44 | 6 |
| Liechtenstein | 49.8 | 19 | 356.6 | 136 | 2.6 | 1 | 2.77 | 138 | 7 |
| Greece | 45.6 | 4,754 | 205.1 | 21,381 | 4.1 | 430 | 1.04 | 48 | 6 |
| Latvia | 41.1 | 776 | 125.6 | 2,370 | 2.1 | 40 | 1.46 | 60 | 6 |
| Germany | 41.1 | 34,437 | 375.6 | 314,660 | 11.4 | 9,589 | 1.28 | 52 | 6 |
| Finland | 35.5 | 1,966 | 204.8 | 11,345 | 6.2 | 346 | 1.58 | 56 | 6 |
| Norway | 32.0 | 1,737 | 276.9 | 15,012 | 5.1 | 275 | 1.19 | 38 | 5 |
| Cyprus | 21.1 | 255 | 158.9 | 1,918 | 2.0 | 24 | 1.19 | 25 | 4 |

| Colour scale | | | | | | | | |
|--------------|-------|-------|-------|-------|-------|------|------|--|
| >150.0 | Worst | Worst | Worst | Worst | Worst | >2.0 | >150 | |
| 0.0 | Best | Best | Best | Best | Best | 0.0 | 0 | |

Table of current situation in some EU provinces. Colour scale is indicated in each legend.

| Province | Reported data | | | | | | Indexes | | |
|--------------|--|-----------------------------|-----------------------------------|------------------|---------------------------------|-------------------|----------------|--------------------|-------------------|
| | 14-day attack rate /10 ⁵ inh. | Active cases (last 14 days) | Attack rate /10 ⁵ inh. | Cumulative cases | Mortality /10 ⁵ inh. | Cumulative deaths | $\rho_7^{(1)}$ | EPG ⁽²⁾ | Biocom-Cov degree |
| Madrid | 682.2 | 45,303 | 3,734.3 | 247,985 | 143.5 | 9,532 | 0.74 | 505 | 9 |
| Prague | 673.5 | 8,567 | 1,858.3 | 23,637 | NA | NA | 1.48 | 1,000 | 9 |
| London | 150.8 | 13,511 | 695.7 | 62,340 | NA | NA | 1.37 | 207 | 8 |
| Berlin | 102.9 | 3,879 | 479.6 | 18,075 | 6.2 | 234 | 1.43 | 147 | 8 |
| Lazio (Rome) | 72.1 | 4,239 | 345.0 | 20,285 | 16.7 | 984 | 1.33 | 96 | 7 |

| Colour scale | | | | | | | | |
|--------------|-------|-------|-------|-------|-------|------|------|--|
| >150.0 | Worst | Worst | Worst | Worst | Worst | >2.0 | >150 | |
| 0.0 | Best | Best | Best | Best | Best | 0.0 | 0 | |

⁽¹⁾ ρ_7 is the average of 7 consecutive ρ , but can still fluctuate. ⁽²⁾ EPG stands for Effective Growth Potential, which is the product of reported cumulative incidence of last 14 days per 10⁵ inhabitants by ρ_7 (empiric reproduction number). Biocom-Cov degree is an epidemiological situation scale based on the level of last week's mean daily new cases (<https://upcommons.upc.edu/handle/2117/189661>, <https://upcommons.upc.edu/handle/2117/189808>).

Situation of hospitalisations and ICUs in some EU countries. The analysis is done for those countries that report a historical series with current (active) number of patients in hospitals and ICUs¹. We provide:

- Current active hospitalisations and patients in ICU per 100,000 inhabitants.
- Current absolute number of active hospitalisations and patients in ICU.
- Rate of occupation of curative care hospital beds by Covid-19 patients (data from Eurostat 2018²), only for hospitalisations.
- Current rate of occupation with regards to the maximum Covid-19 occupation reached in this pandemic.
- Weekly increase in Covid-19 patients in hospitals and ICUs.

| Country | Hospitalisations | | | | | Intensive Care Units | | | |
|-------------|------------------------------|----------------|--------------------------------|-------------------------------------|-------------------------|------------------------------|----------------|-------------------------------------|-------------------------|
| | Active /10 ⁵ inh. | Active (total) | Occupation (Eurostat 2018) (%) | Occupation (historical maximum) (%) | Week-to-week Growth (%) | Active /10 ⁵ inh. | Active (total) | Occupation (historical maximum) (%) | Week-to-week Growth (%) |
| Hungary | 14.7 | 1418 | 3.4 | 100.0 | 40.3 | 1.6 | 154 | 100.0 | 96.2 |
| France | 12.6 | 8252 | 4.1 | 25.6 | 13.5 | 2.3 | 1492 | 21.1 | 11.7 |
| Belgium | 11.5 | 1329 | 2.3 | 23.1 | 38.8 | 2.1 | 243 | 18.9 | 24.7 |
| Italy | 8.7 | 5273 | 3.4 | 16.0 | 27.0 | 0.7 | 452 | 11.1 | 26.4 |
| Portugal | 8.6 | 877 | 2.6 | 100.0 | 17.6 | 1.3 | 128 | 56.1 | 11.1 |
| Slovenia | 8.3 | 172 | 2.0 | 100.0 | 44.6 | 1.3 | 26 | 70.3 | 34.7 |
| Slovakia | 7.2 | 393 | 1.5 | 100.0 | 33.4 | 0.2 | 12 | 70.6 | 1.1 |
| Austria | 5.2 | 464 | 1.0 | 34.0 | 2.3 | 1.1 | 97 | 32.4 | 0.8 |
| Switzerland | 3.7 | 317 | 1.0 | 14.1 | 33.1 | 0.5 | 43 | 11.1 | 47.0 |

Colour scale

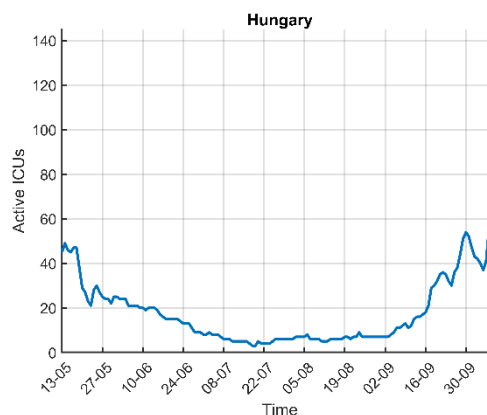
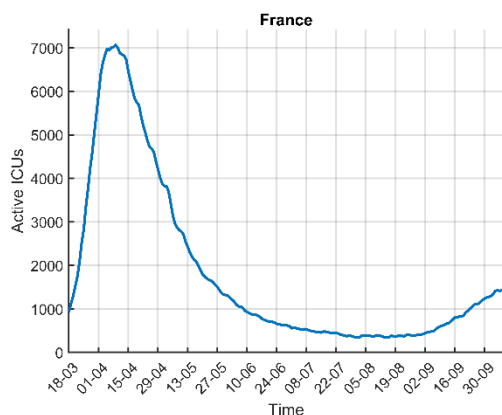
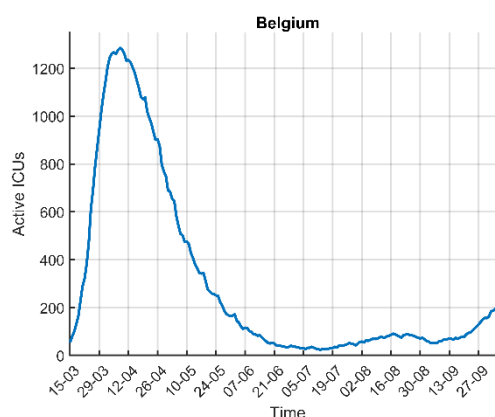
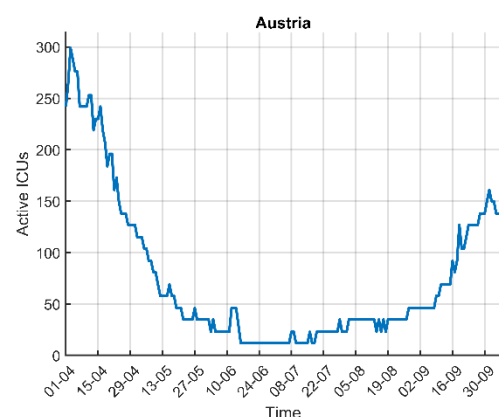
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Colour scale

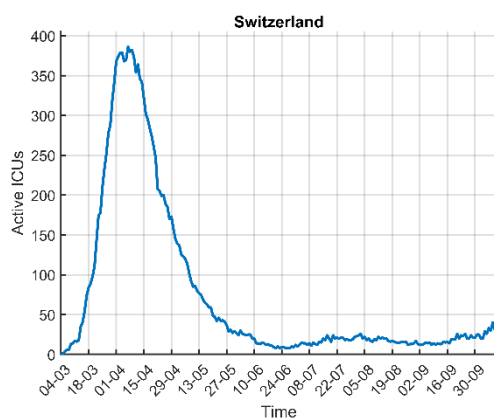
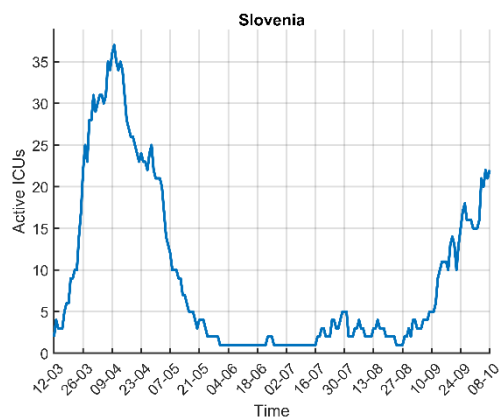
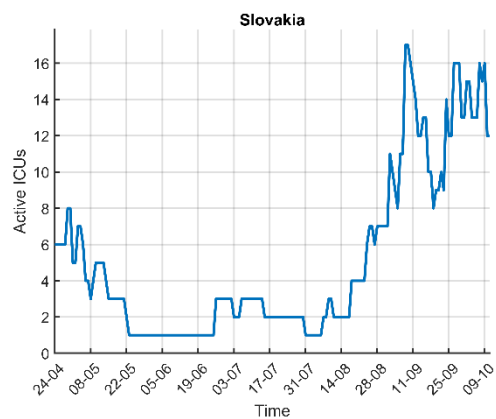
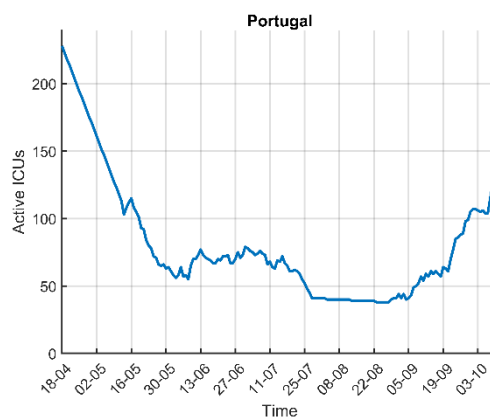
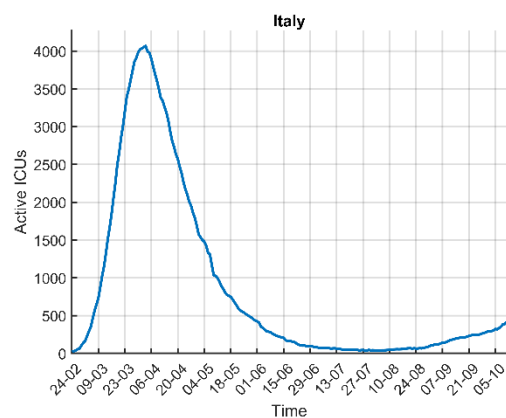
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¹ <https://github.com/ec-jrc/COVID-19>

² https://ec.europa.eu/eurostat/databrowser/view/hlth_rs_bds/default/table?lang=en



Situation and trends in some European regions³

Table of current situation in Switzerland regions. Colour scale is indicated in each legend.

| Region | Reported data | | | | | | Indexes | | |
|------------------------|--|-----------------------------|-----------------------------------|------------------|---------------------------------|-------------------|-------------------------------|--------------------|-------------------|
| | 14-day attack rate /10 ⁵ inh. | Active cases (last 14 days) | Attack rate /10 ⁵ inh. | Cumulative cases | Mortality /10 ⁵ inh. | Cumulative deaths | p ₇ ⁽¹⁾ | EPG ⁽²⁾ | Biocom-Cov degree |
| Fribourg | 1,451.3 | 566 | 7,579.5 | 2,956 | 264.1 | 103 | 2.51 | 3,646 | 9 |
| Zurich | 526.5 | 2,148 | 2,438.7 | 9,950 | 36.5 | 149 | 1.52 | 800 | 9 |
| Uri | 455.6 | 41 | 2,022.2 | 182 | 77.8 | 7 | 2.02 | 922 | 9 |
| Lucerne | 380.2 | 308 | 1,884.0 | 1,526 | 29.6 | 24 | 2.66 | 1,012 | 9 |
| Schwyz | 264.1 | 404 | 636.6 | 974 | 17.0 | 26 | 2.82 | 745 | 9 |
| Geneva | 253.8 | 1,269 | 1,917.0 | 9,585 | 63.2 | 316 | NA | NA | NA |
| Jura | 220.5 | 161 | 656.2 | 479 | 9.6 | 7 | 2.84 | 625 | 9 |
| Appenzell Innerrhoden | 212.5 | 34 | 456.3 | 73 | 0.0 | 0 | 4.00 | 850 | 9 |
| Neuchâtel | 202.8 | 359 | 824.3 | 1,459 | 52.0 | 92 | 1.67 | 340 | 9 |
| Zug | 198.3 | 238 | 558.3 | 670 | 7.5 | 9 | 2.08 | 412 | 9 |
| Valais | 179.0 | 621 | 956.8 | 3,320 | 45.8 | 159 | 2.37 | 424 | 9 |
| Nidwalden | 153.5 | 66 | 490.7 | 211 | 9.3 | 4 | 1.97 | 303 | 9 |
| Obwalden | 126.3 | 48 | 444.7 | 169 | 2.6 | 1 | 3.00 | 379 | 9 |
| Vaud | 119.4 | 954 | 1,411.8 | 11,280 | 55.9 | 447 | 0.55 | 66 | 7 |
| St. Gallen | 111.8 | 579 | 424.9 | 2,201 | 8.1 | 42 | 1.55 | 173 | 8 |
| Bern | 94.8 | 981 | 426.4 | 4,413 | 10.0 | 104 | 1.68 | 159 | 8 |
| Graubünden | 89.9 | 178 | 635.9 | 1,259 | 25.3 | 50 | 2.06 | 185 | 8 |
| Appenzell Ausserrhoden | 87.3 | 48 | 396.4 | 218 | 5.5 | 3 | 1.21 | 105 | 7 |
| Basel City | 81.6 | 151 | 790.3 | 1,462 | 29.2 | 54 | 1.96 | 160 | 8 |
| Liechtenstein | 79.5 | 31 | 379.5 | 148 | 2.6 | 1 | 1.83 | 145 | 7 |
| Ticino | 76.5 | 270 | 1,106.8 | 3,907 | 99.2 | 350 | 2.75 | 210 | 8 |
| Glarus | 75.0 | 30 | 525.0 | 210 | 32.5 | 13 | 1.50 | 113 | 7 |
| Thurgau | 72.5 | 200 | 332.2 | 917 | 6.9 | 19 | 1.75 | 127 | 7 |
| Schaffhausen | 70.3 | 52 | 331.1 | 245 | 10.8 | 8 | 1.35 | 95 | 7 |
| Solothurn | 67.2 | 168 | 411.6 | 1,029 | 7.2 | 18 | 1.21 | 81 | 7 |
| Aargau | 61.7 | 418 | 445.3 | 3,019 | 8.1 | 55 | 2.16 | 133 | 7 |
| Basel Country | 49.5 | 139 | 468.3 | 1,316 | 13.2 | 37 | 2.14 | 106 | 7 |

| Colour scale | | | | | | | | |
|--------------|-------|-------|-------|-------|-------|-------|------|------|
| >150.0 | Worst | Worst | Worst | Worst | Worst | Worst | >2.0 | >150 |
| 0.0 | Best | Best | Best | Best | Best | Best | 0.0 | 0 |

Table of current situation in Netherlands regions. Colour scale is indicated in each legend.

| Region | Reported data | | | | | | Indexes | | |
|---------------|--|-----------------------------|-----------------------------------|------------------|---------------------------------|-------------------|-------------------------------|--------------------|-------------------|
| | 14-day attack rate /10 ⁵ inh. | Active cases (last 14 days) | Attack rate /10 ⁵ inh. | Cumulative cases | Mortality /10 ⁵ inh. | Cumulative deaths | p ₇ ⁽¹⁾ | EPG ⁽²⁾ | Biocom-Cov degree |
| Groningen | 849.0 | 1,698 | 1,670.5 | 3,341 | 11.0 | 22 | 1.12 | 953 | 9 |
| South Holland | 555.0 | 20,584 | 1,483.0 | 55,006 | 39.7 | 1,474 | 1.34 | 743 | 9 |
| Utrecht | 469.5 | 6,136 | 1,169.4 | 15,284 | 35.2 | 460 | 1.47 | 692 | 9 |
| North Holland | 458.1 | 13,070 | 1,280.5 | 36,533 | 31.5 | 900 | 1.30 | 594 | 9 |
| North Brabant | 360.0 | 9,163 | 1,031.5 | 26,251 | 62.4 | 1,587 | 1.56 | 562 | 9 |
| Overijssel | 301.1 | 3,481 | 718.7 | 8,308 | 30.8 | 356 | 1.49 | 450 | 9 |
| Gelderland | 297.1 | 6,156 | 843.8 | 17,484 | 34.7 | 718 | 1.50 | 447 | 9 |
| Flevoland | 260.0 | 1,100 | 764.3 | 3,233 | 23.9 | 101 | 1.40 | 364 | 9 |
| Drenthe | 257.7 | 1,268 | 488.2 | 2,402 | 12.2 | 60 | 1.84 | 475 | 9 |
| Friesland | 249.2 | 1,615 | 470.7 | 3,050 | 11.1 | 72 | 1.41 | 352 | 9 |
| Limburg | 244.2 | 2,134 | 996.1 | 8,706 | 88.4 | 773 | 1.65 | 402 | 9 |
| Zeeland | 144.4 | 553 | 496.1 | 1,900 | 19.1 | 73 | 1.58 | 228 | 8 |

| Colour scale | | | | | | | | |
|--------------|-------|-------|-------|-------|-------|-------|------|------|
| >150.0 | Worst | Worst | Worst | Worst | Worst | Worst | >2.0 | >150 |
| 0.0 | Best | Best | Best | Best | Best | Best | 0.0 | 0 |

³ <https://github.com/ec-jrc/COVID-19/tree/master/data-by-region>

Table of current situation in Germany regions. Colour scale is indicated in each legend.

| Region | Reported data | | | | | | Indexes | | |
|------------------------|--|-----------------------------|-----------------------------------|------------------|---------------------------------|-------------------|----------------|--------------------|-------------------|
| | 14-day attack rate /10 ⁵ inh. | Active cases (last 14 days) | Attack rate /10 ⁵ inh. | Cumulative cases | Mortality /10 ⁵ inh. | Cumulative deaths | $\rho_7^{(1)}$ | EPG ⁽²⁾ | Biocom-Cov degree |
| Bremen | 129.2 | 708 | 562.0 | 3,080 | 11.1 | 61 | 1.63 | 211 | 8 |
| Berlin | 102.9 | 3,879 | 479.6 | 18,075 | 6.2 | 234 | 1.43 | 147 | 8 |
| Hamburg | 67.0 | 1,273 | 472.0 | 8,963 | 14.6 | 277 | 1.26 | 84 | 7 |
| Nordrhein-Westfalen | 62.8 | 11,261 | 446.1 | 79,981 | 10.7 | 1,913 | 1.45 | 91 | 7 |
| Hessen | 54.2 | 3,395 | 351.7 | 22,039 | 9.0 | 562 | 1.51 | 82 | 6 |
| Baden-Württemberg | 49.2 | 5,445 | 490.9 | 54,345 | 17.2 | 1,901 | 1.56 | 77 | 6 |
| Bayern | 44.6 | 5,830 | 559.5 | 73,186 | 20.5 | 2,685 | 1.47 | 65 | 6 |
| Saarland | 41.2 | 408 | 374.0 | 3,703 | 17.9 | 177 | 1.92 | 79 | 6 |
| Rheinland-Pfalz | 38.0 | 1,552 | 296.4 | 12,106 | 6.3 | 256 | 1.59 | 60 | 6 |
| Niedersachsen | 36.2 | 2,890 | 283.9 | 22,662 | 8.7 | 697 | 1.30 | 47 | 5 |
| Sachsen | 31.7 | 1,291 | 206.4 | 8,413 | 6.1 | 248 | 2.10 | 67 | 6 |
| Brandenburg | 22.0 | 554 | 189.3 | 4,771 | 6.7 | 169 | 1.63 | 36 | 4 |
| Schleswig Holstein | 19.9 | 574 | 182.0 | 5,260 | 5.6 | 162 | 1.25 | 25 | 4 |
| Thüringen | 18.2 | 388 | 207.9 | 4,442 | 8.9 | 191 | 1.40 | 25 | 4 |
| Sachsen-Anhalt | 14.9 | 329 | 132.8 | 2,932 | 3.1 | 68 | 1.15 | 17 | 3 |
| Mecklenburg-Vorpommern | 13.8 | 222 | 85.3 | 1,373 | 1.2 | 20 | 1.44 | 20 | 4 |

| Colour scale | | | | | | | | |
|--------------|-------|-------|-------|-------|-------|-------|------|------|
| >150.0 | Worst | Worst | Worst | Worst | Worst | Worst | >2.0 | >150 |
| 0.0 | Best | Best | Best | Best | Best | Best | 0.0 | 0 |

Table of current situation in Czech Republic regions. Colour scale is indicated in each legend.

| Country | Reported data | | | | Indexes | | |
|-----------------|--|-----------------------------|-----------------------------------|------------------|----------------|--------------------|-------------------|
| | 14-day attack rate /10 ⁵ inh. | Active cases (last 14 days) | Attack rate /10 ⁵ inh. | Cumulative cases | $\rho_7^{(1)}$ | EPG ⁽²⁾ | Biocom-Cov degree |
| Prague | 673.5 | 8,567 | 1,858.3 | 23,637 | 1.48 | 1,000 | 9 |
| Zlínský | 663.2 | 3,913 | 1,146.1 | 6,762 | 1.67 | 1,108 | 9 |
| Středočeský | 589.8 | 7,520 | 1,341.9 | 17,109 | 1.59 | 939 | 9 |
| Liberecký | 510.0 | 2,254 | 970.1 | 4,288 | 1.69 | 862 | 9 |
| Olomoucký | 504.4 | 3,188 | 981.5 | 6,203 | 1.71 | 864 | 9 |
| Vysocina | 497.3 | 2,551 | 995.3 | 5,106 | 1.72 | 856 | 9 |
| Plzeňský | 485.3 | 2,839 | 1,044.8 | 6,112 | 1.58 | 767 | 9 |
| Jihoceský | 452.2 | 2,903 | 858.7 | 5,513 | 1.96 | 885 | 9 |
| Jihomoravský | 450.6 | 5,353 | 921.2 | 10,944 | 1.64 | 741 | 9 |
| Moravskoslezský | 450.4 | 5,418 | 1,125.9 | 13,544 | 1.81 | 815 | 9 |
| Pardubický | 388.5 | 2,020 | 876.2 | 4,556 | 1.71 | 664 | 9 |
| Královéhradecký | 379.9 | 2,093 | 760.3 | 4,189 | 2.08 | 791 | 9 |
| Ústecký | 348.3 | 2,891 | 712.2 | 5,911 | 1.67 | 580 | 9 |
| Karlovarský | 274.6 | 810 | 790.2 | 2,331 | 1.46 | 402 | 9 |

| Colour scale | | | | | | |
|--------------|-------|-------|-------|------|------|--|
| >150.0 | Worst | Worst | Worst | >2.0 | >150 | |
| 0.0 | Best | Best | Best | 0.0 | 0 | |

Situation and trends in other countries

| Country | Reported data | | | | | | Indexes | | |
|--------------------------|--|-----------------------------|-----------------------------------|------------------|---------------------------------|-------------------|-------------|--------------------|-------------------|
| | 14-day attack rate /10 ⁵ inh. | Active cases (last 14 days) | Attack rate /10 ⁵ inh. | Cumulative cases | Mortality /10 ⁵ inh. | Cumulative deaths | $p_7^{(1)}$ | EPG ⁽²⁾ | Biocom-Cov degree |
| Israel | 702.5 | 60,802 | 3,371.6 | 291,828 | 22.9 | 1,983 | 0.67 | 470 | 9 |
| Argentina | 404.6 | 182,881 | 1,978.5 | 894,193 | 52.8 | 23,868 | 1.07 | 434 | 9 |
| United States of America | 195.6 | 647,498 | 2,345.2 | 7,762,544 | 64.9 | 214,771 | 1.10 | 215 | 9 |
| Colombia | 193.1 | 98,260 | 1,791.0 | 911,316 | 54.7 | 27,834 | 1.24 | 240 | 9 |
| Brazil | 170.6 | 362,673 | 2,397.0 | 5,094,982 | 70.8 | 150,488 | 0.95 | 163 | 8 |
| Ukraine | 142.7 | 62,400 | 596.9 | 261,034 | 11.4 | 4,972 | 1.11 | 158 | 8 |
| Peru | 133.7 | 44,069 | 2,576.0 | 849,371 | 101.0 | 33,305 | 0.98 | 131 | 8 |
| Iraq | 131.5 | 52,880 | 1,000.3 | 402,330 | 24.5 | 9,852 | 0.83 | 109 | 8 |
| Chile | 122.8 | 23,470 | 2,518.1 | 481,371 | 69.7 | 13,318 | 0.92 | 113 | 8 |
| Russia | 100.9 | 147,280 | 889.9 | 1,298,718 | 15.5 | 22,597 | 1.21 | 122 | 8 |
| Qatar | 100.7 | 2,901 | 4,442.3 | 127,985 | 7.6 | 220 | 1.04 | 104 | 7 |
| India | 77.3 | 1,045,836 | 526.3 | 7,120,538 | 8.1 | 109,150 | 0.93 | 72 | 7 |
| Ecuador | 69.6 | 12,286 | 833.4 | 147,033 | 69.1 | 12,191 | 0.99 | 69 | 6 |
| Canada | 66.2 | 24,992 | 471.9 | 178,117 | 25.4 | 9,585 | 1.00 | 66 | 6 |
| Mexico | 65.2 | 84,011 | 631.6 | 814,328 | 64.9 | 83,642 | 1.76 | 115 | 7 |
| Iran | 63.8 | 53,627 | 595.4 | 500,075 | 34.0 | 28,544 | 1.09 | 70 | 6 |
| Belarus | 62.7 | 5,925 | 884.0 | 83,534 | 9.5 | 896 | 1.08 | 68 | 6 |
| Philippines | 32.0 | 35,115 | 309.7 | 339,341 | 5.8 | 6,321 | 0.99 | 32 | 5 |
| Indonesia | 21.3 | 58,236 | 121.9 | 333,449 | 4.3 | 11,844 | 1.04 | 22 | 4 |
| Saudi Arabia | 17.4 | 6,074 | 974.5 | 339,267 | 14.5 | 5,043 | 0.94 | 16 | 3 |
| Pakistan | 3.7 | 8,091 | 144.4 | 318,932 | 3.0 | 6,570 | 1.07 | 4 | 2 |

| Colour scale | | | | | | | | |
|--------------|-------|-------|-------|-------|-------|-------|------|------|
| >150.0 | Worst | Worst | Worst | Worst | Worst | Worst | >2.0 | >150 |
| 0.0 | Best | Best | Best | Best | Best | Best | 0.0 | 0 |

⁽¹⁾ p_7 is the average of 7 consecutive p , but can still fluctuate. ⁽²⁾ EPG stands for Effective Growth Potential, which is the product of reported cumulative incidence of last 14 days per 10⁵ inhabitants by p_7 (empiric reproduction number). Biocom-Cov degree is an epidemiological situation scale based on the level of last week's mean daily new cases (<https://upcommons.upc.edu/handle/2117/189661>, <https://upcommons.upc.edu/handle/2117/189808>).

Analysis: On the relevance of small differences in incidence at reopening time.

We have been investigating during the last weeks the evolution of different countries in Europe. We have shown that there are important indicators showing that, with the exception of Germany, no systematic strong epidemiological surveillance during summer and only Italy has recently achieved one with low level of incidence. We have also shown that, with the possible exception of Italy, most countries have general behaviour that did not prevent the spreading of the virus by strict adherence to mask, distance and hand washing.

These two elements lead us to believe that two elements might have been key in the development of the epidemics since May. First, socio-economic factors that may enhance or reduce the growth rate of the epidemics. Given the relevance of superspreader events in this non-dispersive disease, the interplay between both can be crucial. However, there is another more direct and clearer element, the effect of small initial differences in an epidemic with exponential growth.

Figure 1 shows the evolution from July 1 to October 4 of the number of new cases and of the empirical reproduction number (ρ) in France, Spain, UK, Germany and Italy. For all these countries it is observed that the ρ is almost always greater than 1, so the growth is constant. If we average the ρ_7 since we find: France 1.17; Spain 1.20; UK 1.25; Germany 1.08; Italy 1.13.

Indeed, the **average rate of spread of the pandemic has been higher in the UK, Spain and France than in Germany and Italy**. This points again in the direction of the **relevance of epidemiological surveillance and personal responsibility measure**.

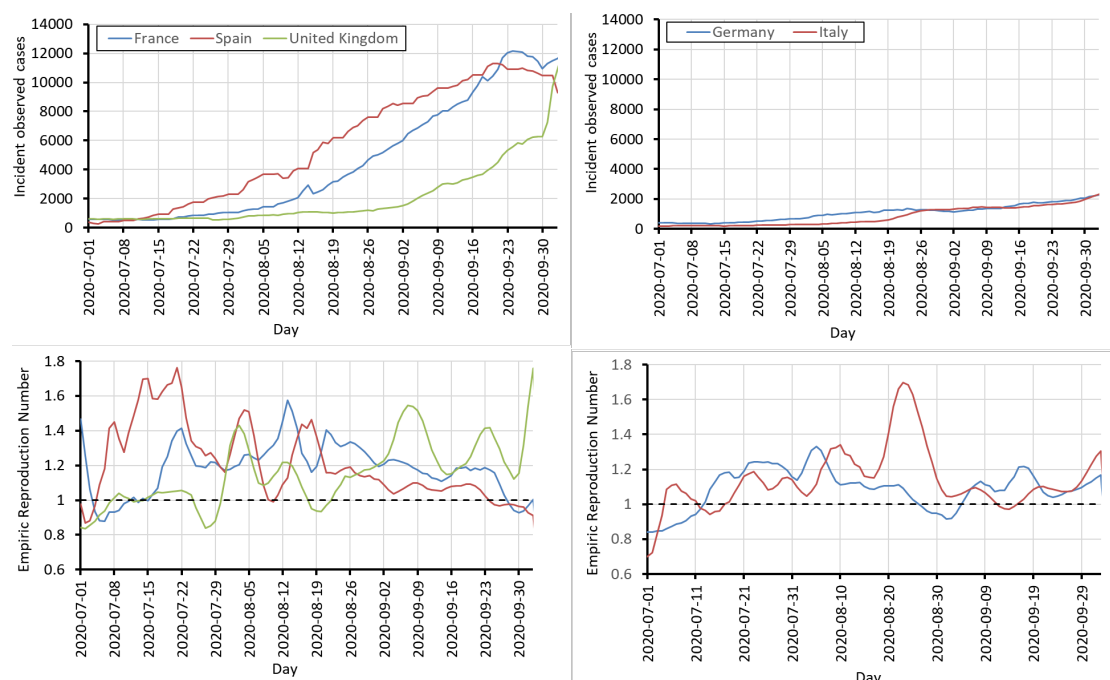


Figure 1. New cases and ρ from July 1 to October 4 in France, Spain, UK, Germany i Italy

However, Germany and Italy are also growing. They are in a similar situation than Spain at the end of July. Its growth is probably slower but if they fail to reduce the value of the reproductive number, their trajectory will be similar to the other three countries a few months behind schedule.

The gradual decline in reproductive numbers in Spain and France in recent weeks might be a reason for moderate optimism.

We proceed to evaluate **whether the differences in the averages between 1.08 (Germany) and 1.25(UK) are more or less important and also assess the effect of the number of daily cases at the beginning of July (Germany 408, France 575, Italy 175, Spain 377, UK 624)**. We will make a very simple discussion, consider a system where the ρ is constant and evaluate how varies the behaviour with different values of ρ and how it varies if we change the initial conditions.

Exponential growth

Let us consider a system with constant growth:

$$N(t = 5) = \rho \cdot N(t = 0)$$

We can compute its daily growth:

$$N(t = 1) = a \cdot N(t = 0)$$

$$N(t = 2) = a \cdot N(t = 1) = a^2 \cdot N(t = 0)$$

$$N(t = 3) = a \cdot N(t = 2) = a^3 \cdot N(t = 0)$$

$$N(t = 4) = a \cdot N(t = 3) = a^4 \cdot N(t = 0)$$

$$N(t = 5) = a \cdot N(t = 4) = a^5 \cdot N(t = 0)$$

We can see that:

$$a = \rho^{1/5}$$

If ρ is constant we can compute the evolution of total new cases any particular day:

$$N(t) = \rho^{t/5} \cdot N(t = 0)$$

We also can use the exponential function:

$$N(t) = \rho^{t/5} \cdot N(t = 0) = N(t = 0)e^{bt}$$

And find the value of the exponent b :

$$\begin{aligned} \rho^{t/5} &= e^{bt} \\ \frac{t}{5} \ln \rho &= b t \\ b &= \frac{1}{5} \ln \rho \end{aligned}$$

Figure 2 shows the evolution for different values of ρ in the same initial conditions.

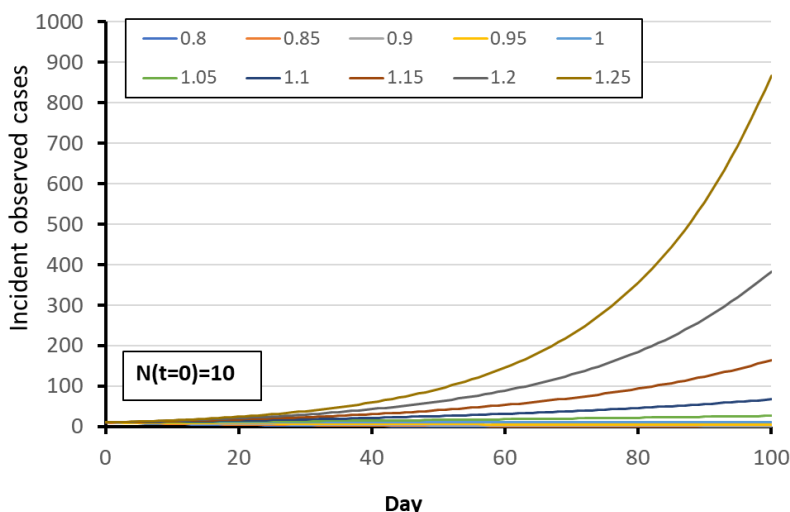


Figure 2. Exponential growth over 100 days by different reproductive numbers.

We can visualize the well-known concept of real exponential growth. In **exponential growths, small variations in growth rate end up causing very important changes in the number of cases**. We find therefore that the differences in the values of average reproductive numbers, despite being small, are very transcendent. **We can easily show the importance of the initial conditions**. Figure 3 shows the same behaviour as in Figure 2 but starting growth with half the cases.

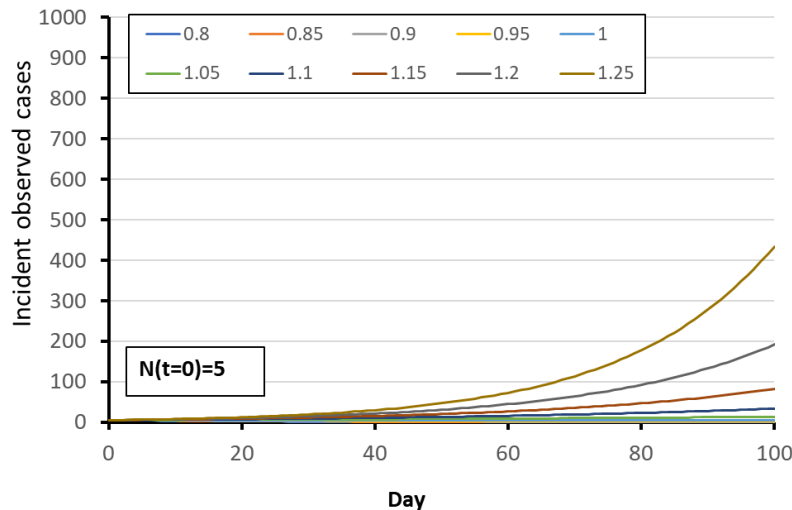


Figure 3. Exponential growth over 100 days by different reproduction numbers with a

We have that, for the different countries, the minimum value of incidence was: UK 13, Spain 9.1, France 8.1, Germany 5.5 and Italy 4.4. We notice that one might think that a difference between 9.1 and 5.5 is nothing, and actually we can observe that even considering a situation where growth rate is dictated by non-dispersion and not by surveillance or personal behaviour a very small difference in initial conditions matter a lot.

We conclude then with a very important and clear graph (figure 4). What would be the **theoretical evolution in each country with his real average growth rate and the same initial conditions**. We can observe that countries behave as we expected, of course in general terms.

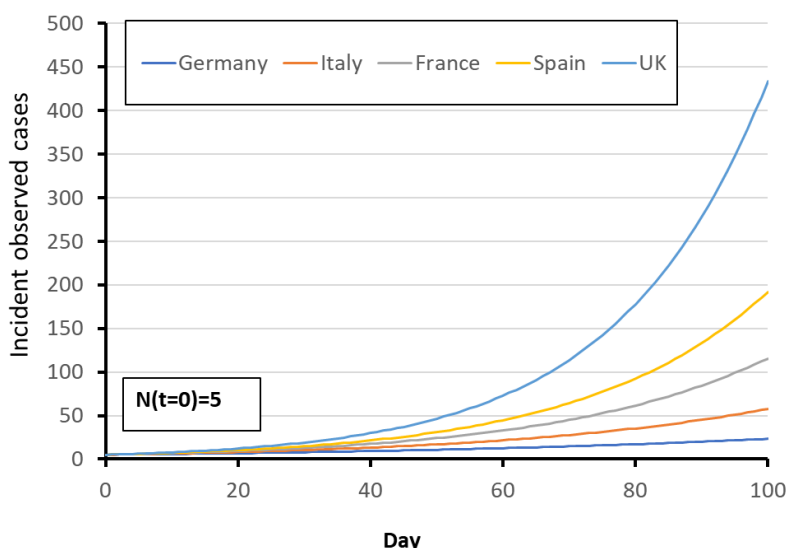


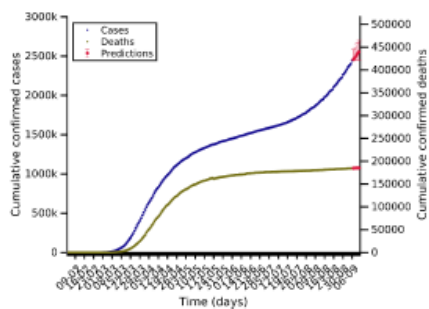
Figure 4. Theoretical exponential growth in Germany, Italy, France, Spain and UK with his average

In the EU+EFTA+UK, we are now suffering a second wave of the pandemic. **It is essential to be aware of the importance of achieving a low reproductive number**. A p greater than 1 implies exponential growth, and as we are seeing lately, if the p increases over time the exponential growth accelerates.

Legend: Countries' reports details

Reported cumulative cases (blue) and deaths (brown), together with predictions (red)

EU+EFTA+UK 06-09-2020. Pop: 2632.4M. Cumulative incidence: 93/10⁵

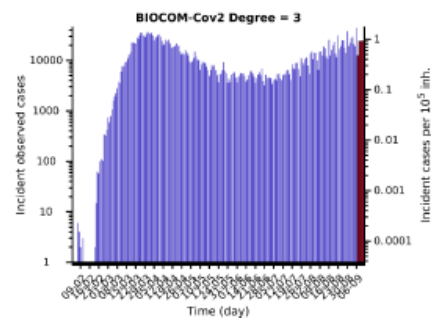
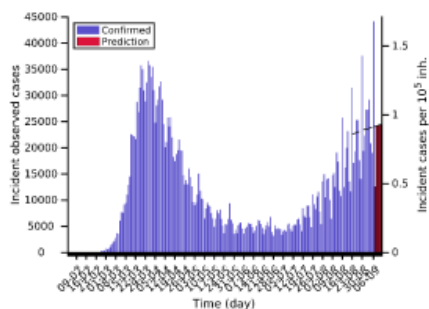


| Predictions for next days | | |
|---------------------------|-------------------|-------------------------|
| Day | Number of cases | 95% confidence interval |
| 07-09-2020 | 2458068 (+125771) | [2445493 - 2586148] |
| 09-09-2020 | 2568527 (+242758) | [2440483 - 2638980] |
| 11-09-2020 | 2553558 (+244355) | [2440483 - 2798208] |

| Current indicators | | |
|--------------------|-----|--------|
| R_{eff} | RPI | CFR |
| 1.3 | 14 | 1.17 % |

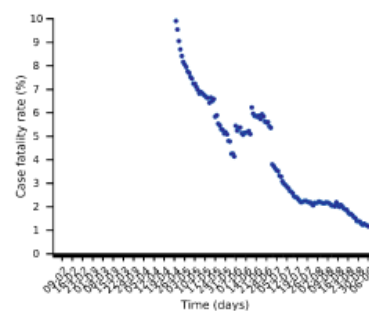
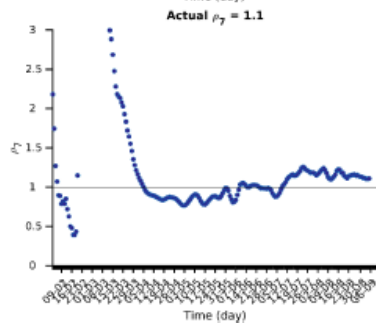
Predictions and indicators

Incident observed cases and predictions.



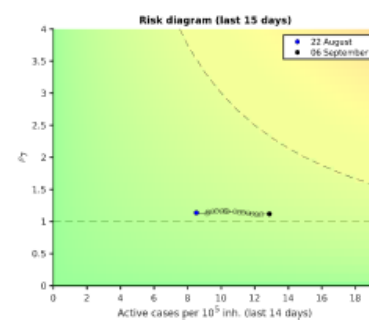
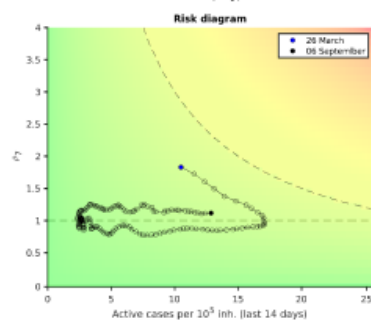
Incident observed cases in a logarithmic scale, with Biocom-Cov degree.

Evolution of empiric reproduction number ρ_T



Case fatality rate

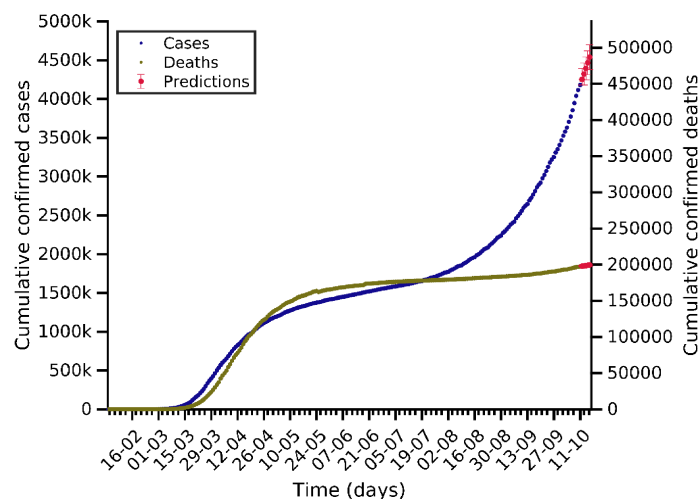
Risk diagram



Risk diagram of last 15 days

**(1) Analysis and prediction of COVID-19
for EU+EFTA+UK**

EU+EFTA+UK 11-10-2020. Pop: 527.9M. Cumulative incidence: 792/10⁵

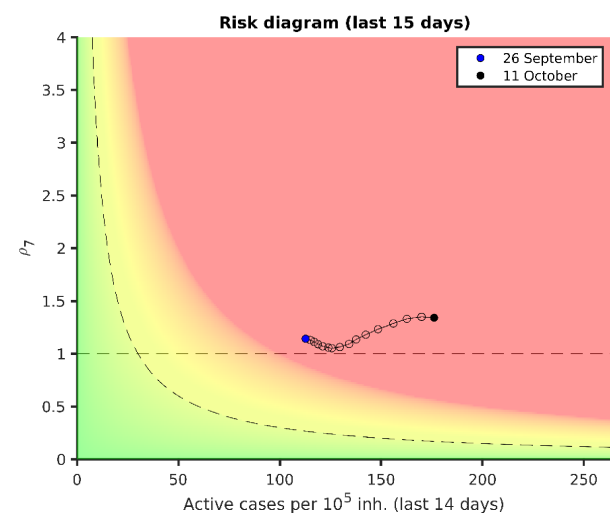
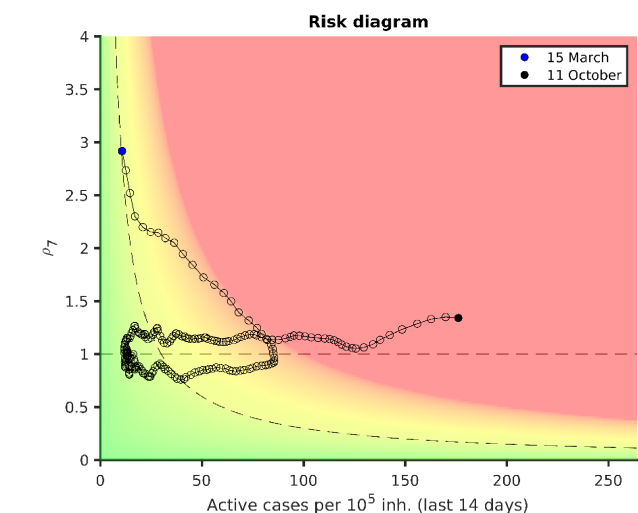
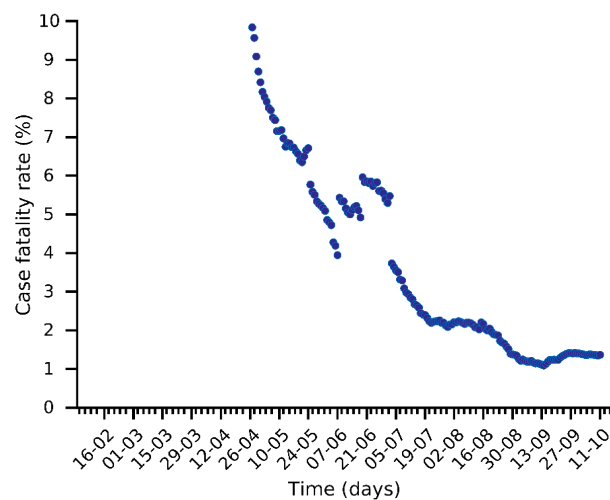
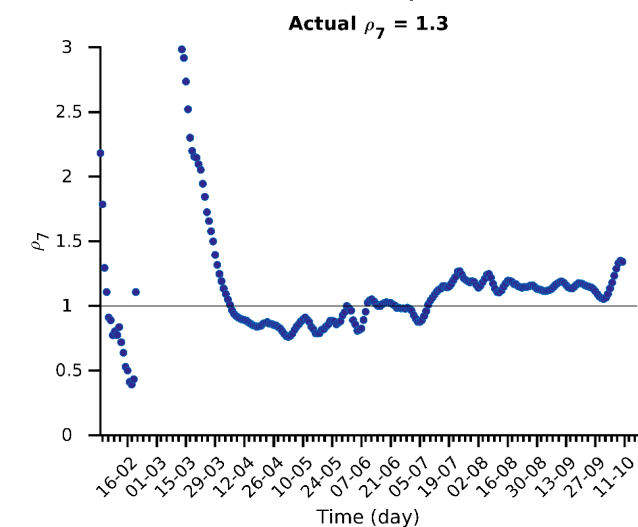
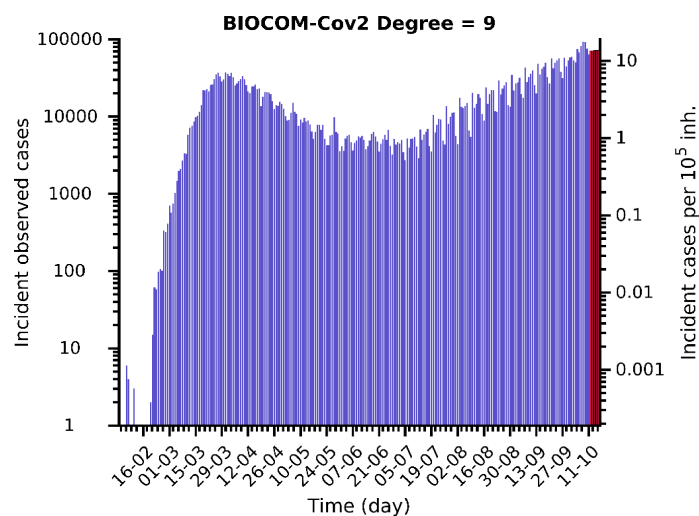
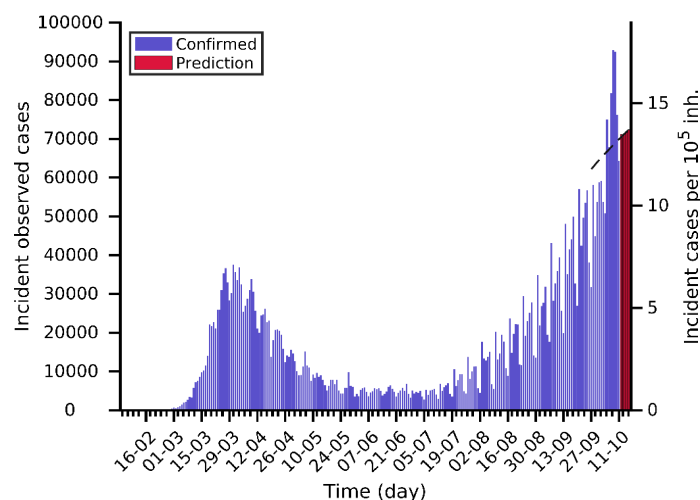


Predictions for next days

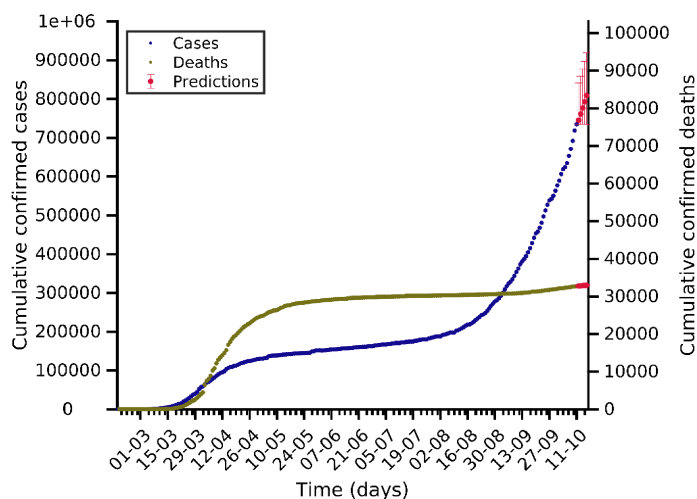
| Day | Number of cases | 95% Confidence Interval |
|------------|------------------|-------------------------|
| 12-10-2020 | 4252420 (+71165) | [4181255 - 4393590] |
| 14-10-2020 | 4394776 (+71420) | [4247484 - 4542069] |
| 16-10-2020 | 4539034 (+72363) | [4378162 - 4699907] |

Current indicators

| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 176 | 236 | 1.36 % |



France 11-10-2020. Pop: 65.3M. Cumulative incidence: 1126/10⁵

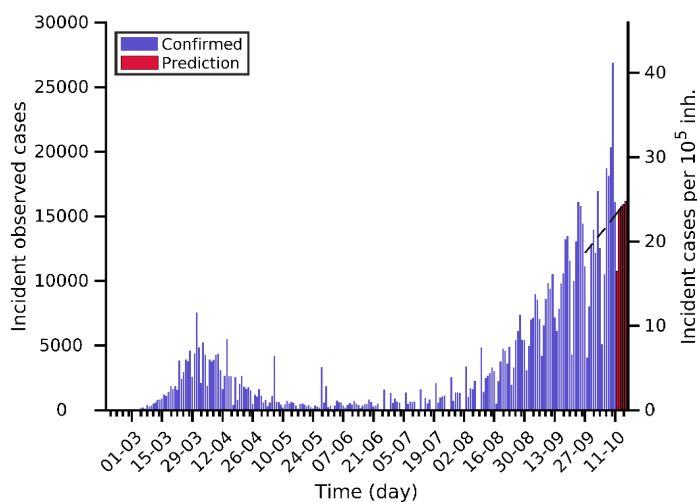


Predictions for next days

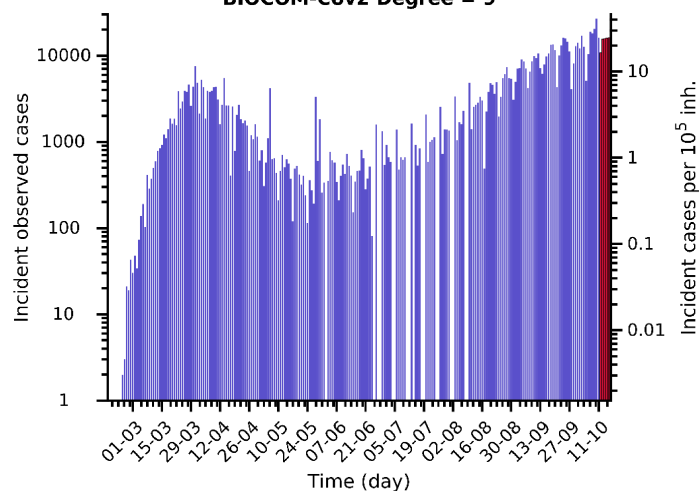
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 745719 (+10745) | [734974 - 841525] |
| 14-10-2020 | 776952 (+15725) | [734974 - 877197] |
| 16-10-2020 | 809061 (+16165) | [734974 - 919426] |

Current indicators

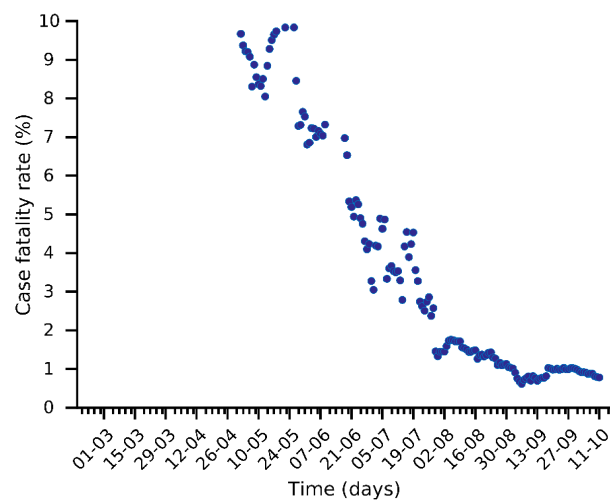
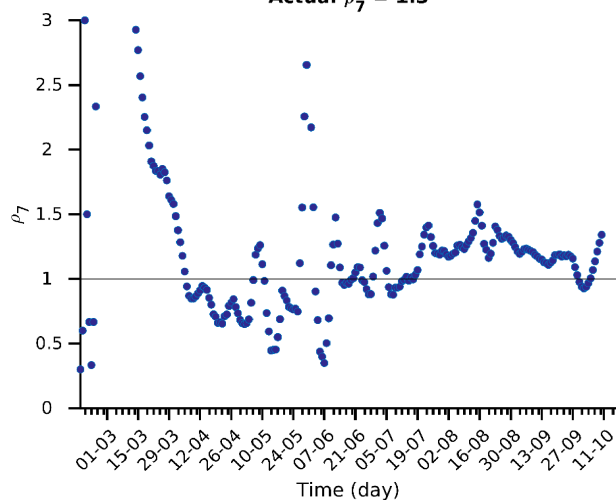
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 301 | 404 | 0.78 % |



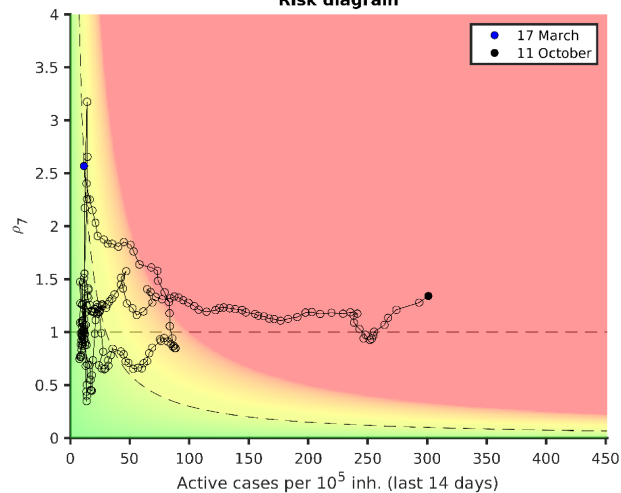
BIOCOM-Cov2 Degree = 9



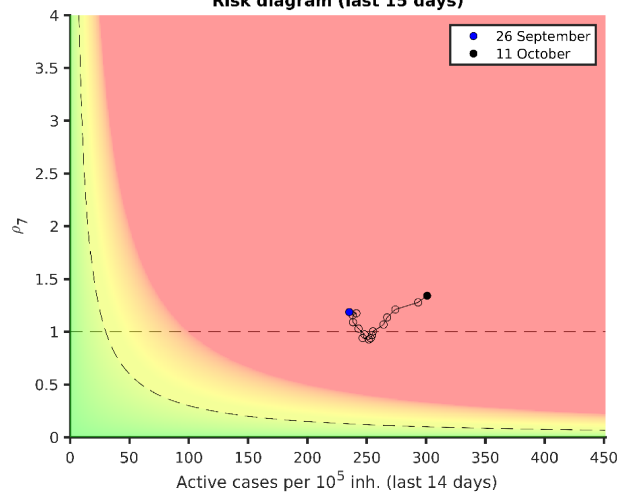
Actual $\rho_7 = 1.3$



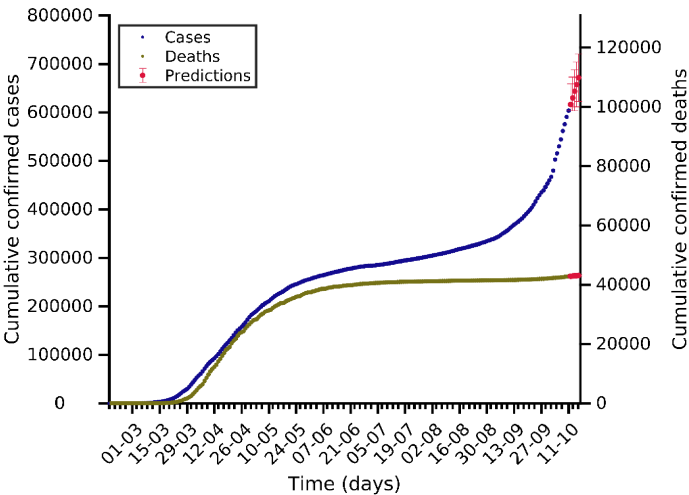
Risk diagram



Risk diagram (last 15 days)

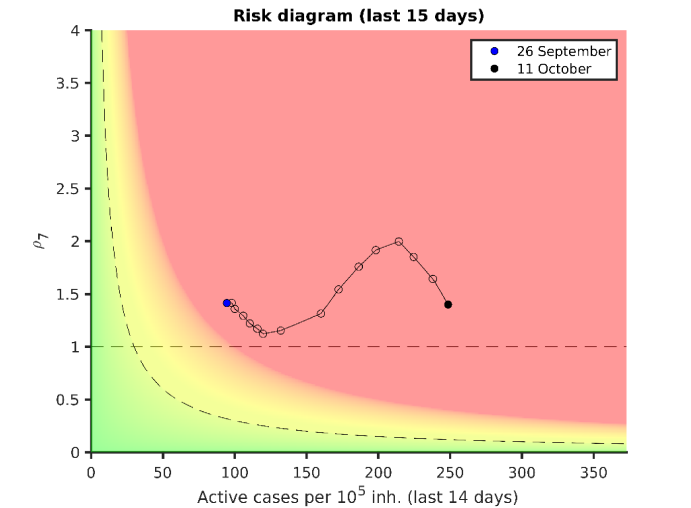
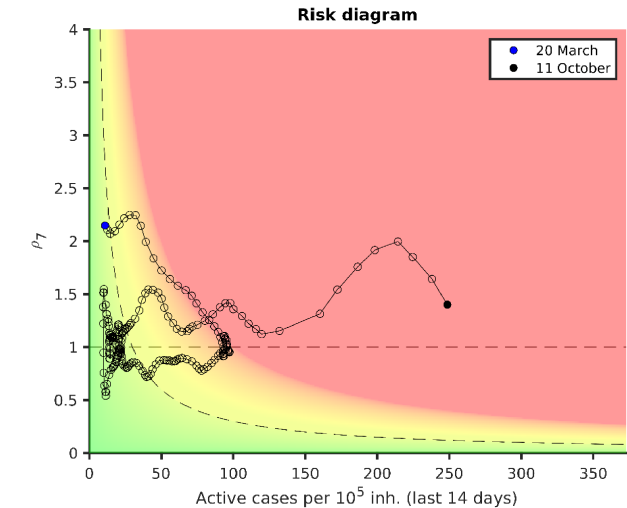
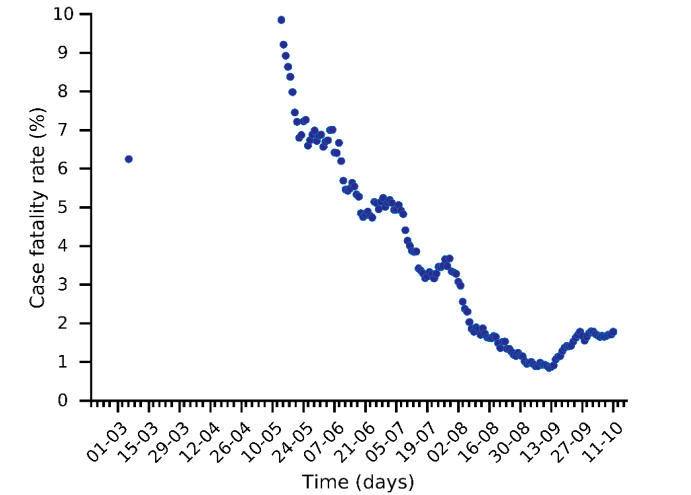
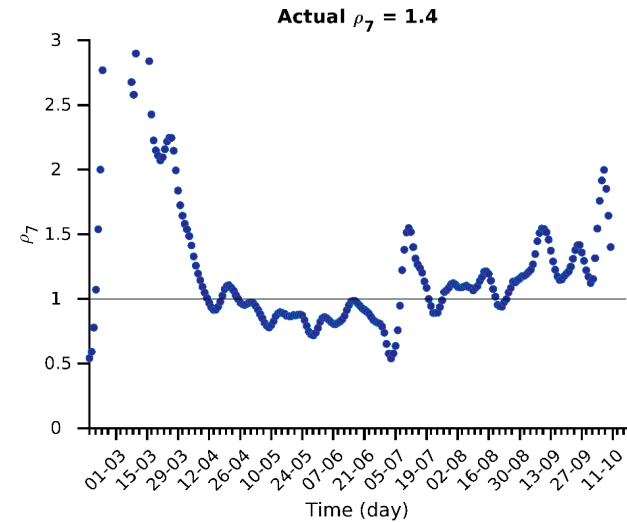
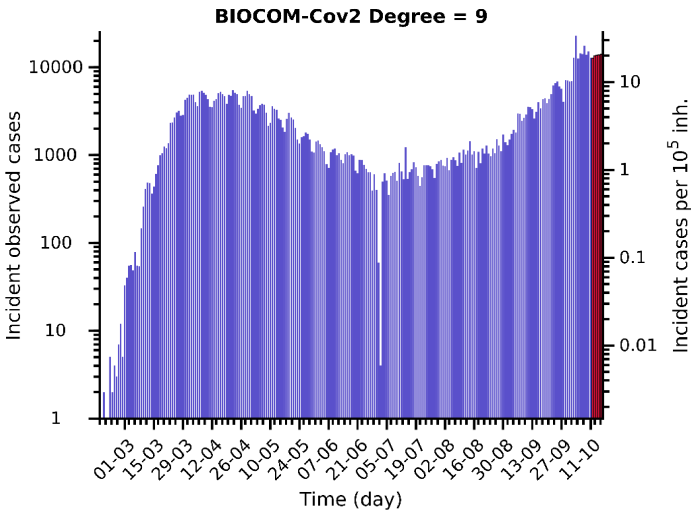
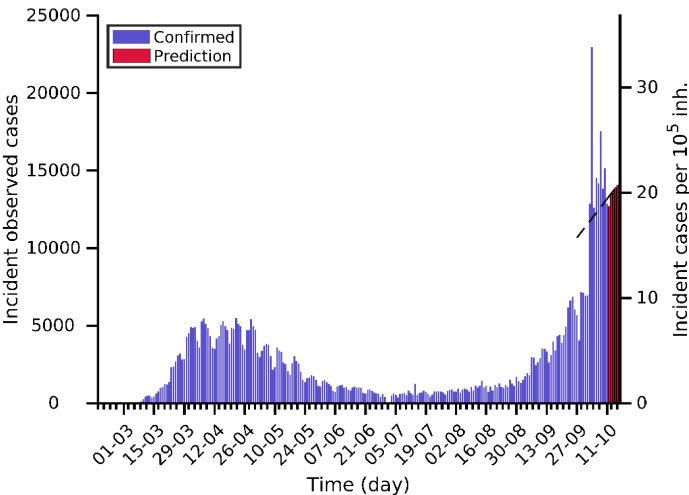


UK 11-10-2020. Pop: 67.9M. Cumulative incidence: 889/10⁵

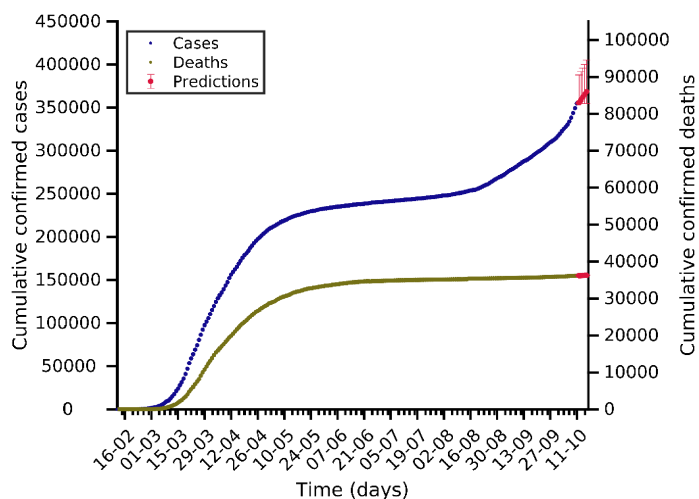


| Predictions for next days | | |
|---------------------------|-----------------|-------------------------|
| Day | Number of cases | 95% Confidence Interval |
| 12-10-2020 | 616403 (+12687) | [603716 - 658780] |
| 14-10-2020 | 643648 (+13713) | [603716 - 687989] |
| 16-10-2020 | 671614 (+14073) | [622802 - 720427] |

| Current indicators | | |
|--------------------|-----|--------|
| A ₁₄ | EPG | CFR |
| 249 | 348 | 1.78 % |



Italy 11-10-2020. Pop: 60.5M. Cumulative incidence: 587/10⁵

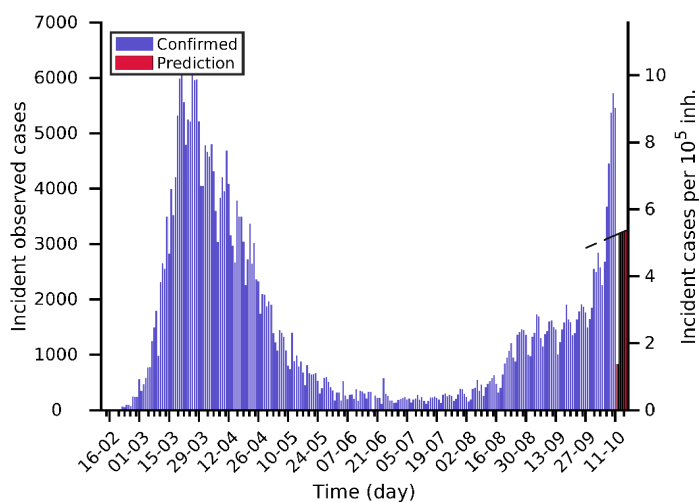


Predictions for next days

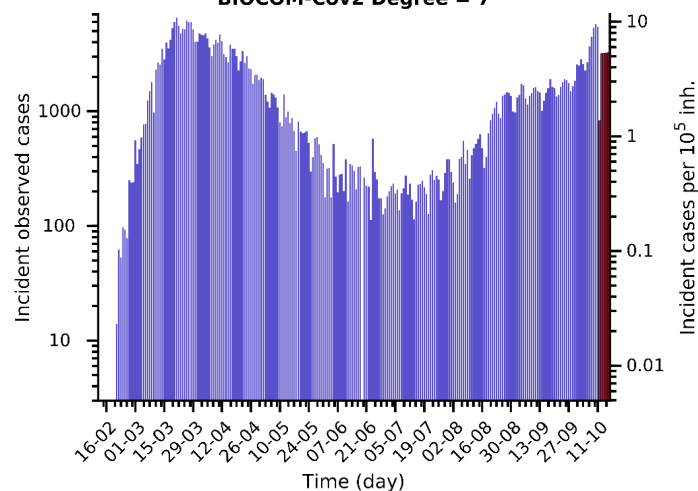
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 355777 (+827) | [354950 - 388063] |
| 14-10-2020 | 362178 (+3209) | [354950 - 395803] |
| 16-10-2020 | 368644 (+3241) | [354950 - 405196] |

Current indicators

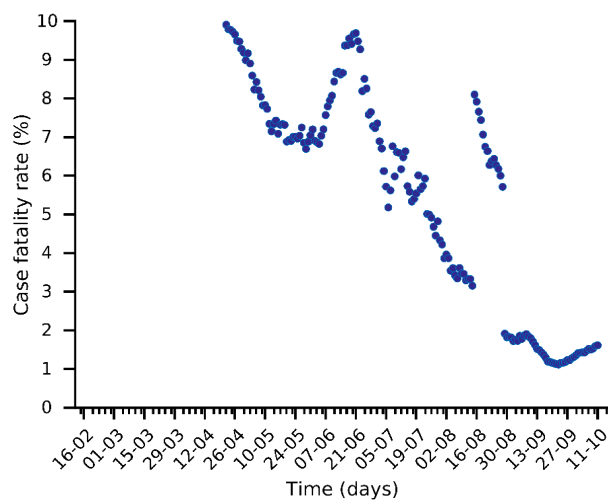
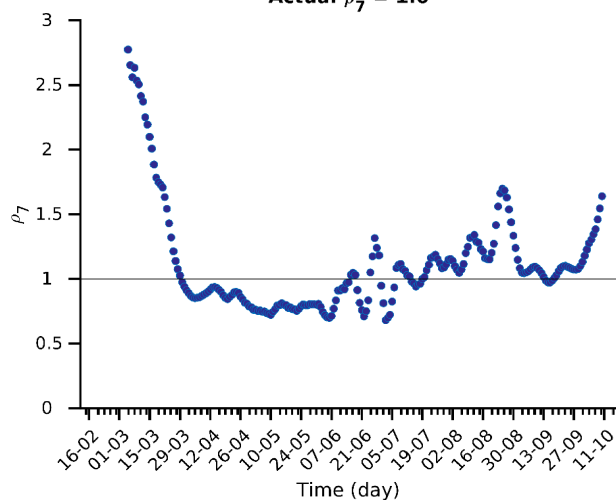
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 75 | 122 | 1.61 % |



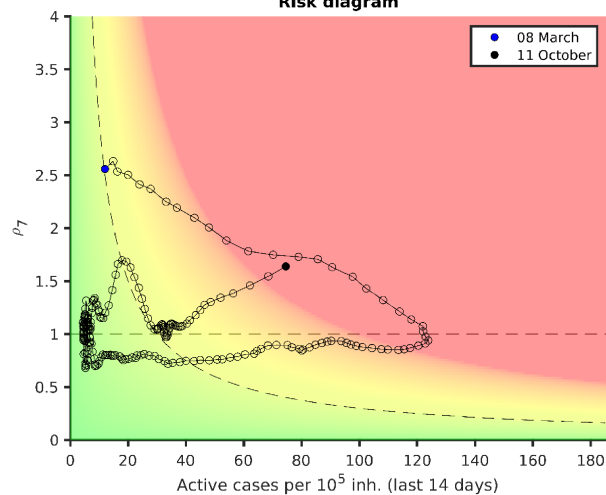
BIOCOM-Cov2 Degree = 7



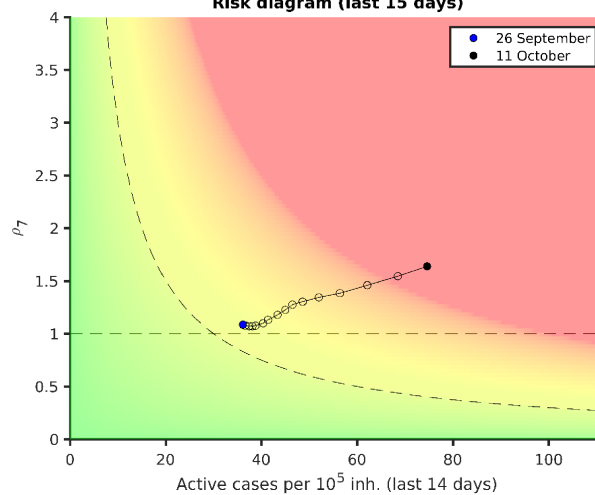
Actual $\rho_7 = 1.6$



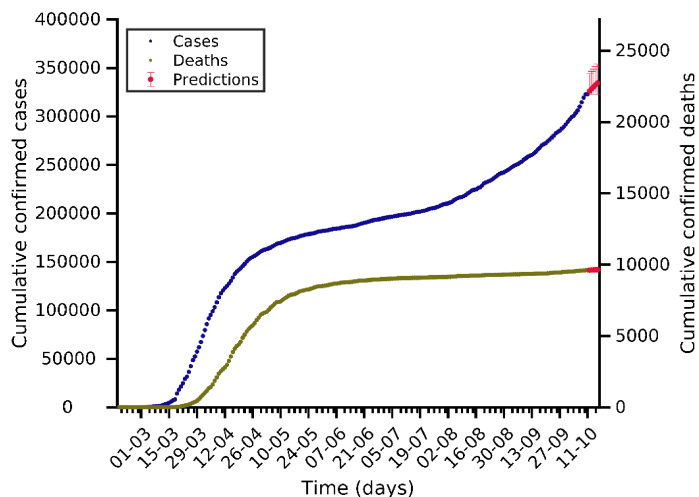
Risk diagram



Risk diagram (last 15 days)



Germany 11-10-2020. Pop: 83.8M. Cumulative incidence: 385/10⁵

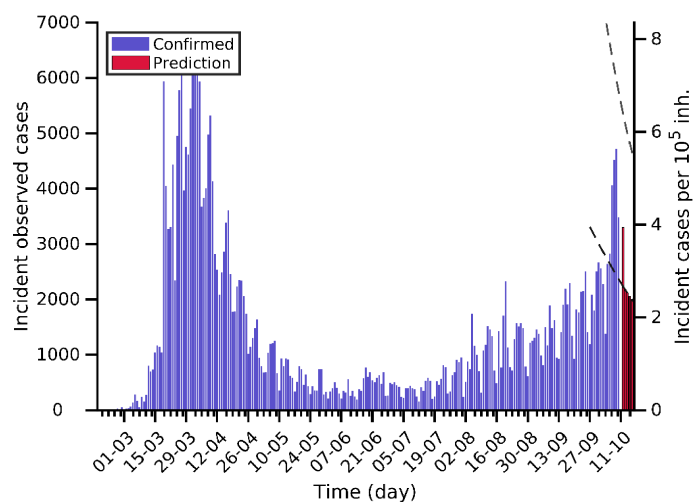


Predictions for next days

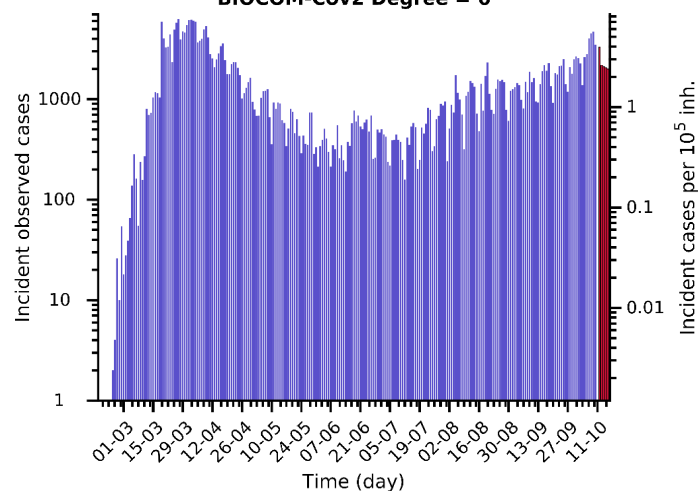
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 326166 (+3302) | [322864 - 344120] |
| 14-10-2020 | 330458 (+2115) | [322864 - 348985] |
| 16-10-2020 | 334509 (+1996) | [322864 - 354160] |

Current indicators

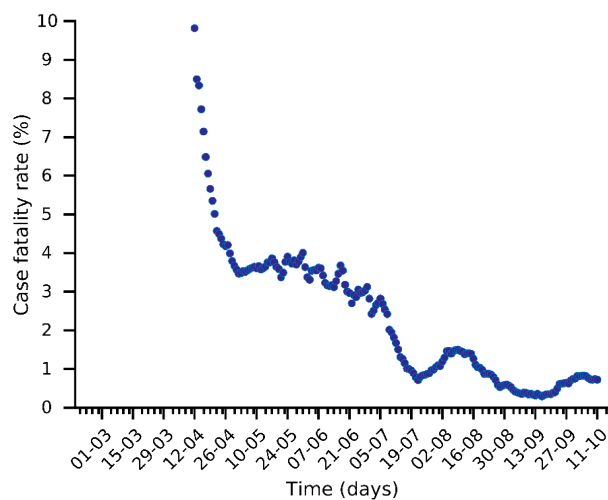
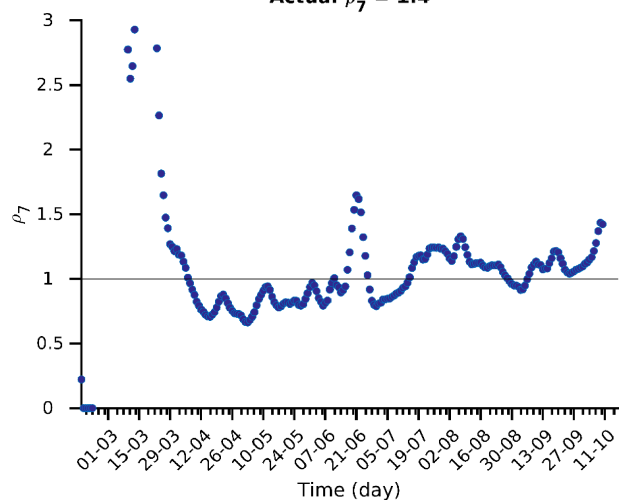
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 45 | 64 | 0.72 % |



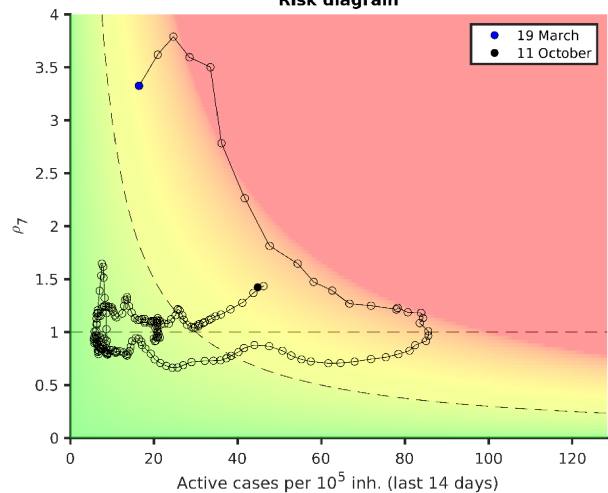
BIOCOM-Cov2 Degree = 6



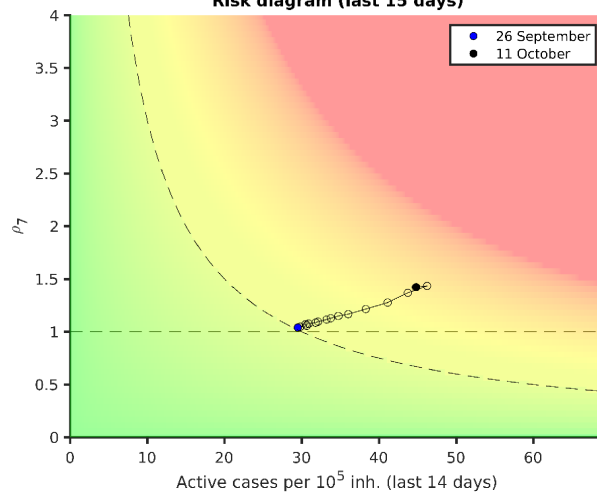
Actual $\rho_7 = 1.4$



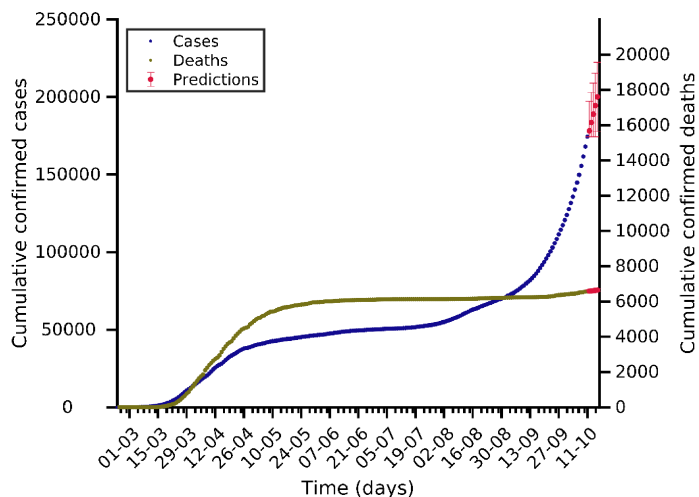
Risk diagram



Risk diagram (last 15 days)



Netherlands 11-10-2020. Pop: 17.1M. Cumulative incidence: 1018/10⁵

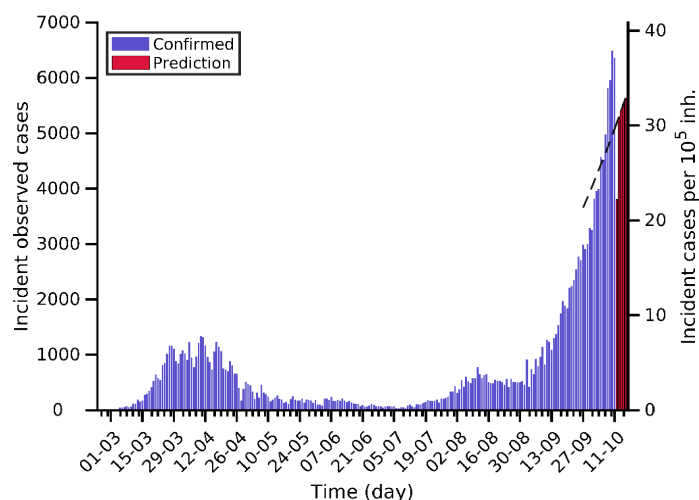


Predictions for next days

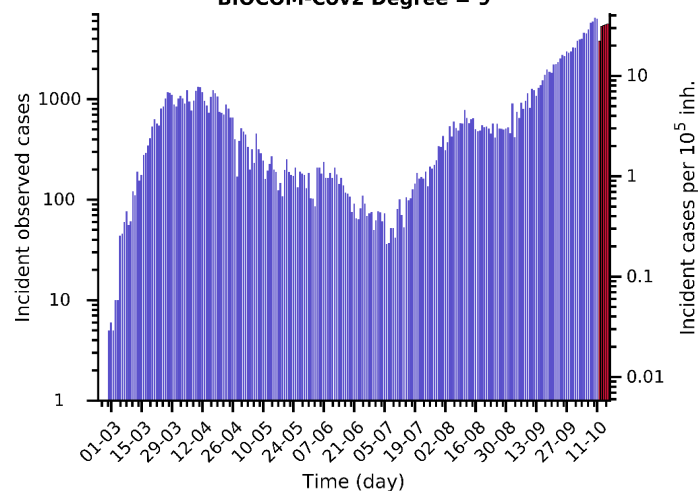
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 178258 (+3808) | [174450 - 197339] |
| 14-10-2020 | 188968 (+5412) | [174450 - 209011] |
| 16-10-2020 | 200134 (+5640) | [177829 - 222439] |

Current indicators

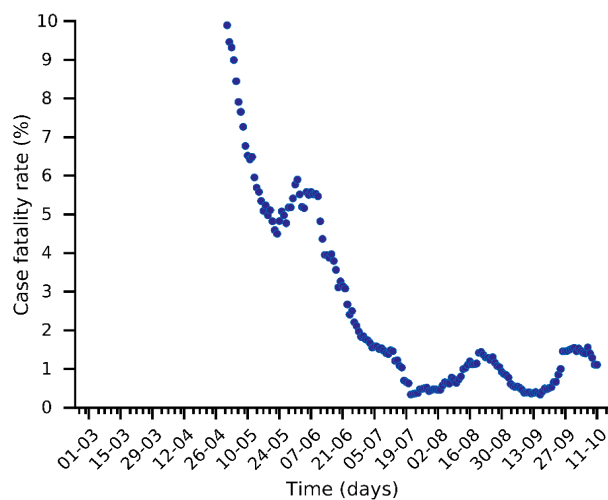
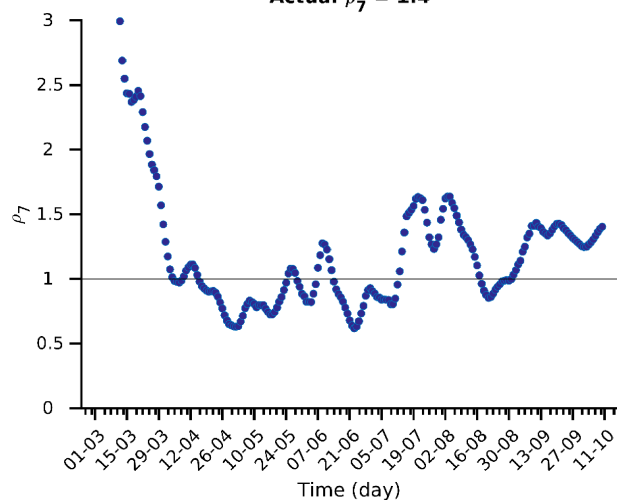
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 367 | 515 | 1.11 % |



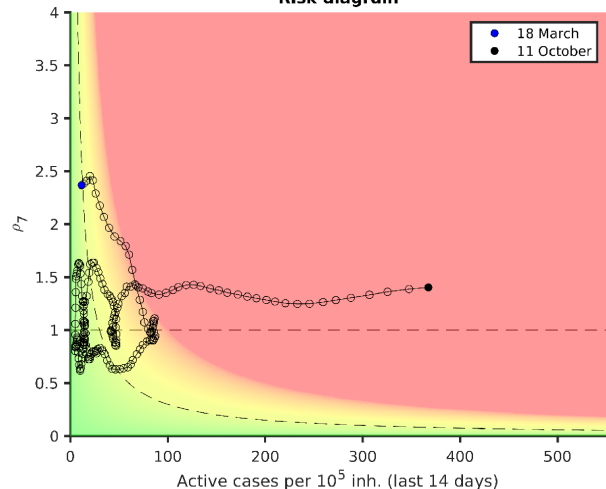
BIOCOM-Cov2 Degree = 9



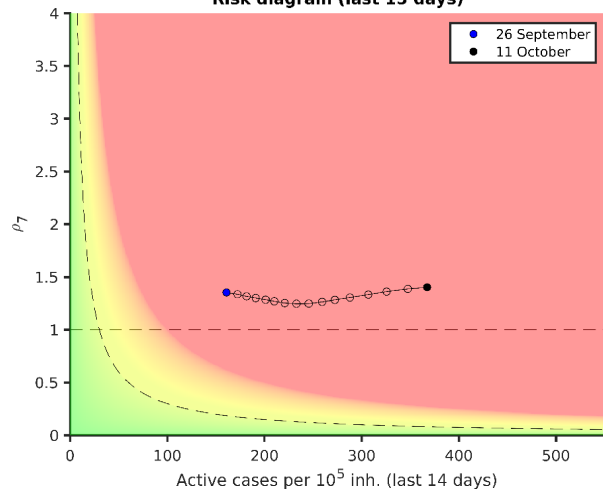
Actual $\rho_7 = 1.4$



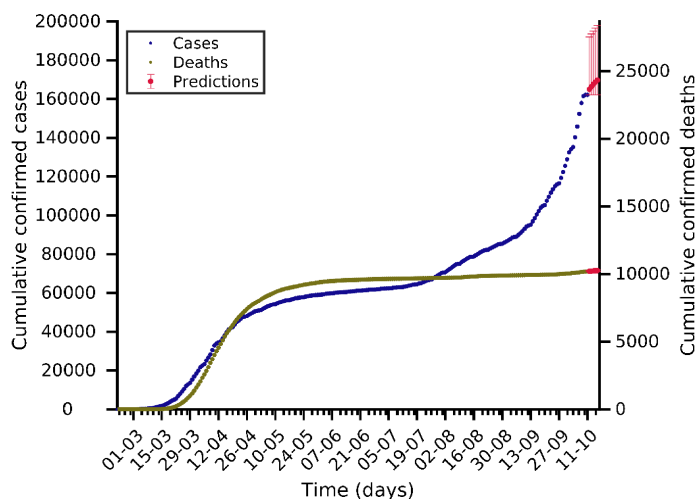
Risk diagram



Risk diagram (last 15 days)



Belgium 11-10-2020. Pop: 11.6M. Cumulative incidence: 1399/10⁵

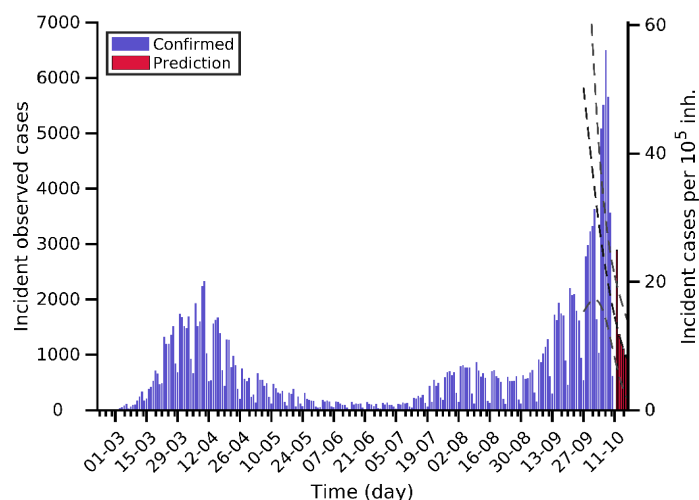


Predictions for next days

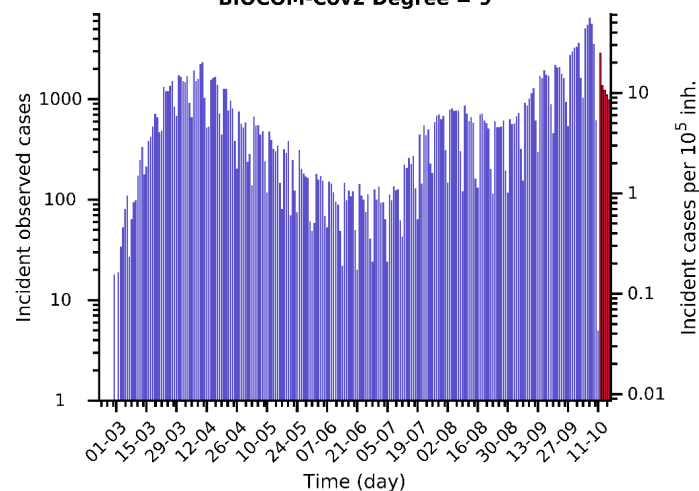
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 165056 (+2891) | [162165 - 192048] |
| 14-10-2020 | 167658 (+1232) | [162165 - 195127] |
| 16-10-2020 | 169759 (+994) | [162165 - 197963] |

Current indicators

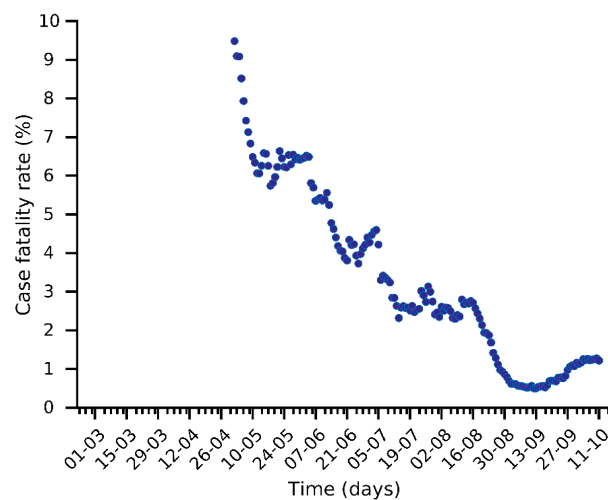
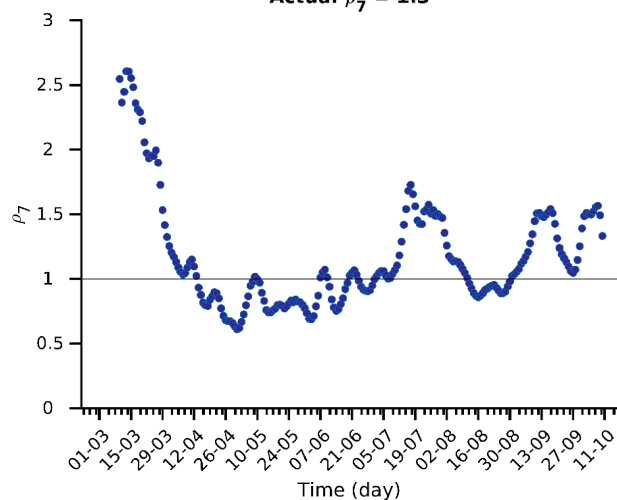
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 393 | 524 | 1.22 % |



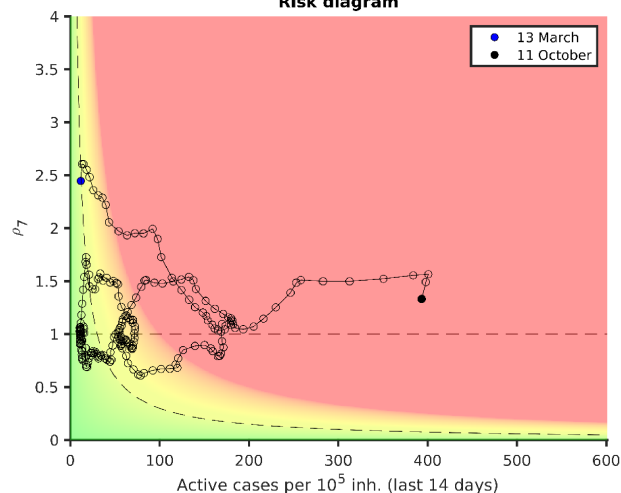
BIOCOM-Cov2 Degree = 9



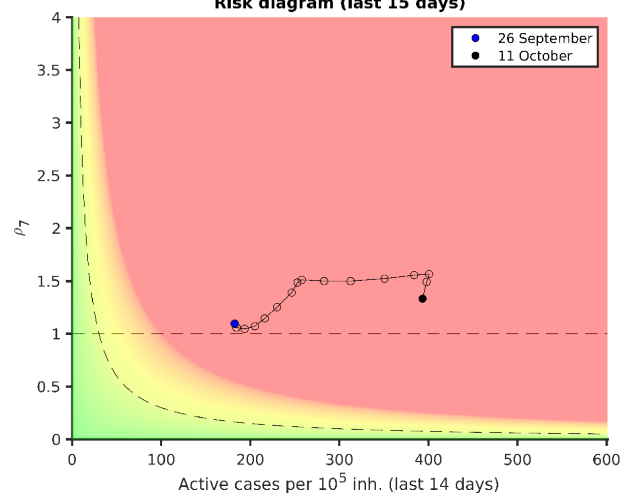
Actual $\rho_7 = 1.3$



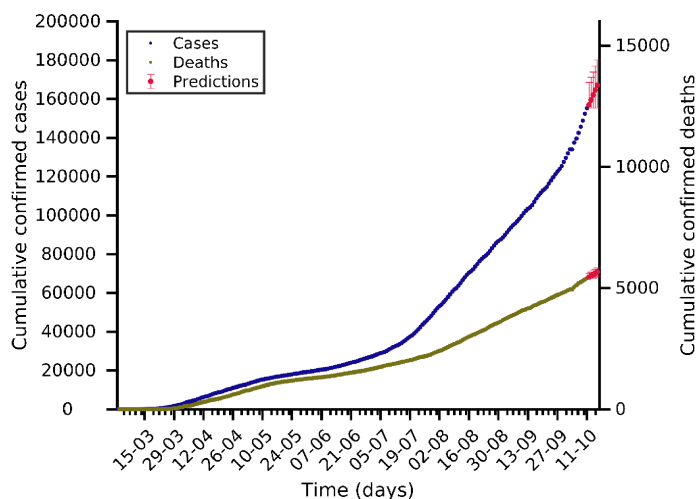
Risk diagram



Risk diagram (last 15 days)



Romania 11-10-2020. Pop: 19.2M. Cumulative incidence: 807/10⁵

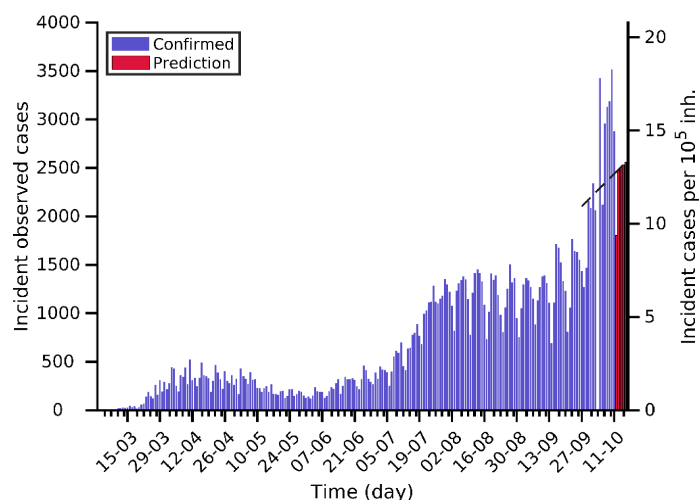


Predictions for next days

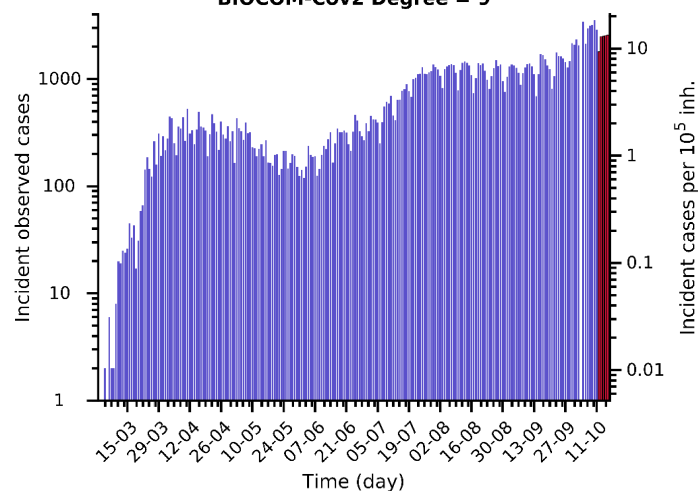
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 157086 (+1803) | [155283 - 168518] |
| 14-10-2020 | 162081 (+2510) | [155283 - 174017] |
| 16-10-2020 | 167172 (+2557) | [155283 - 180233] |

Current indicators

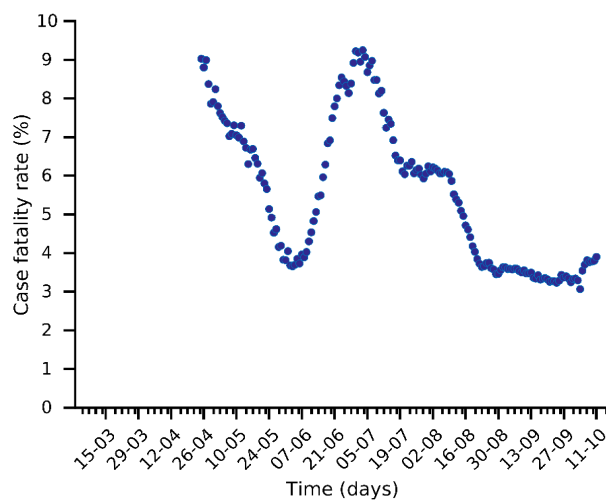
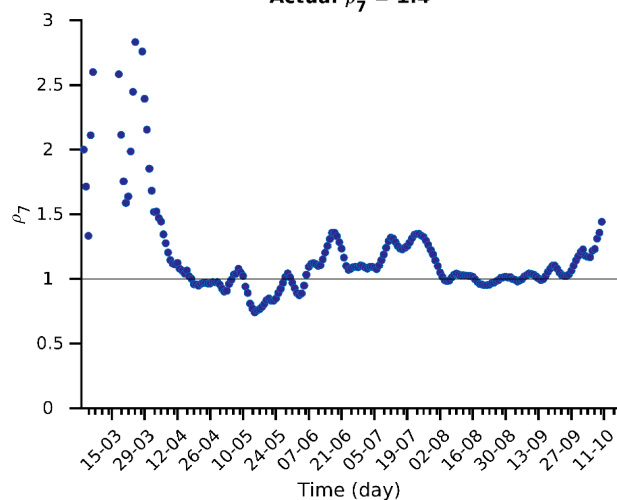
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 170 | 244 | 3.90 % |



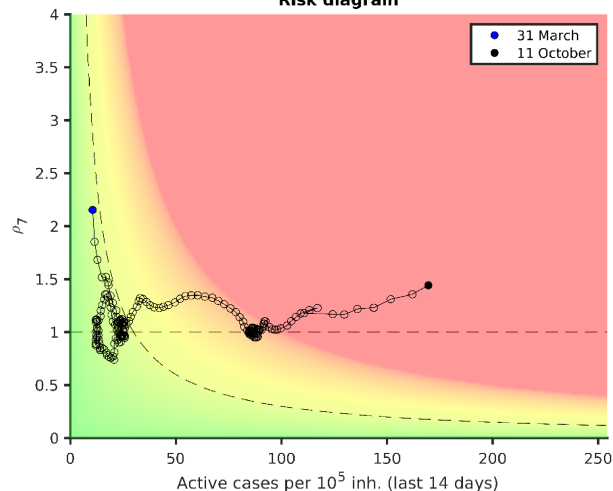
BIOCOM-Cov2 Degree = 9



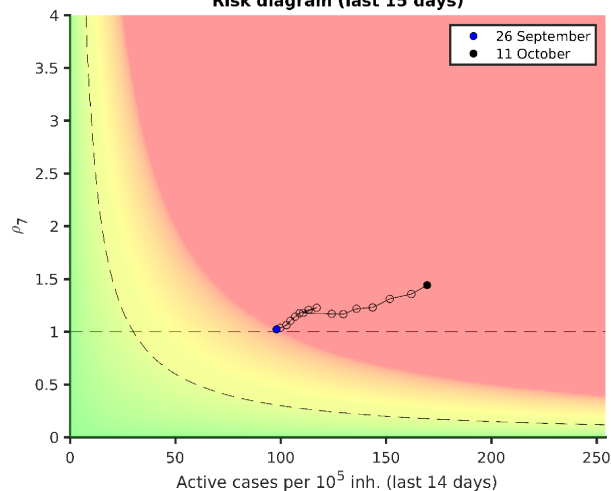
Actual $\rho_7 = 1.4$



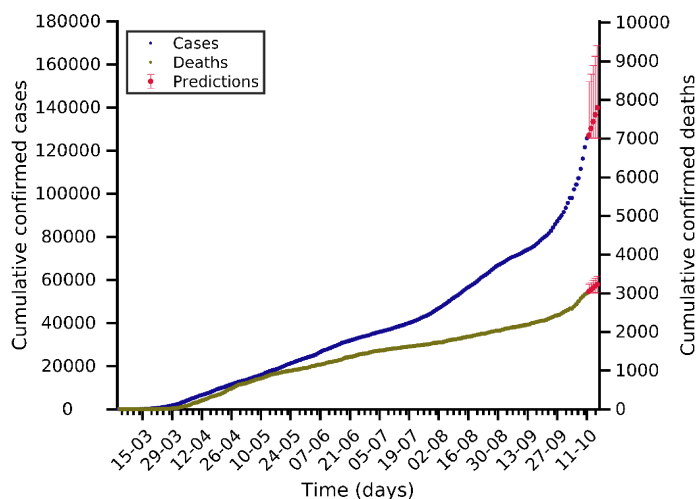
Risk diagram



Risk diagram (last 15 days)



Poland 11-10-2020. Pop: 37.8M. Cumulative incidence: 332/10⁵

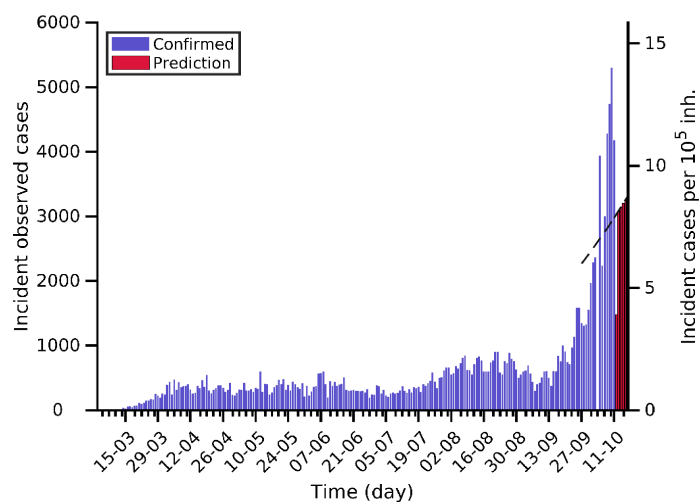


Predictions for next days

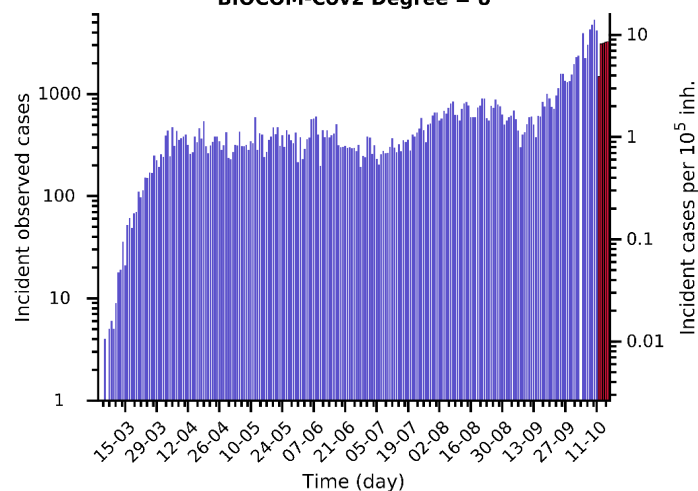
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 127295 (+1479) | [125816 - 152094] |
| 14-10-2020 | 133526 (+3144) | [125816 - 159523] |
| 16-10-2020 | 139984 (+3258) | [125816 - 168758] |

Current indicators

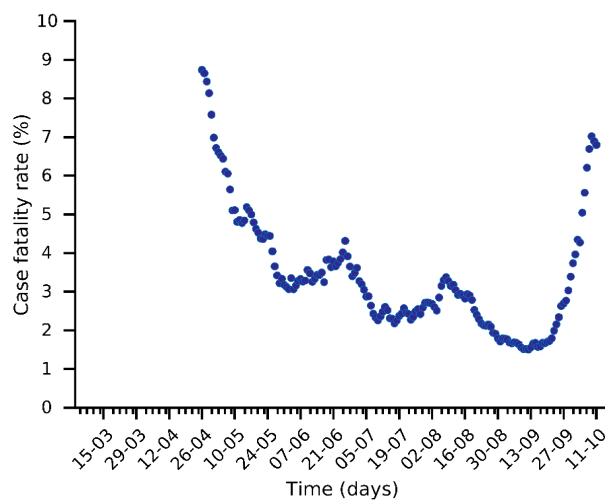
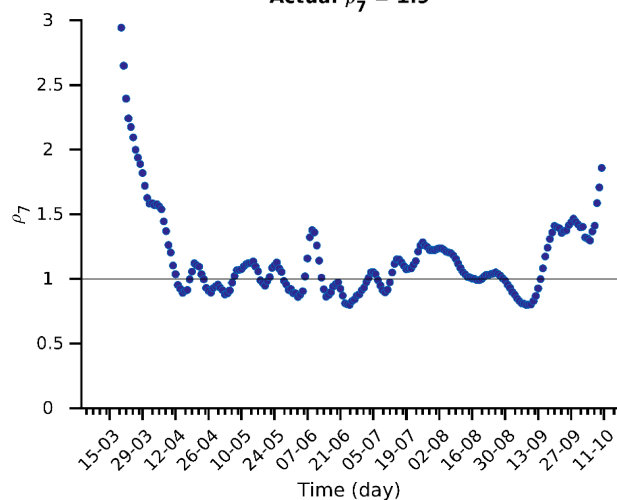
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 102 | 189 | 6.80 % |



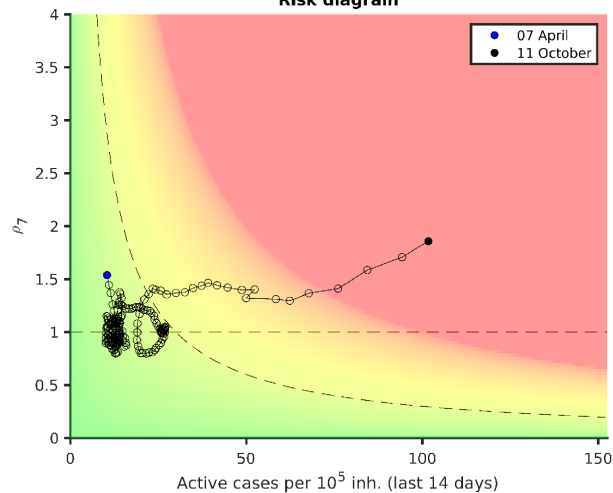
BIOCOM-Cov2 Degree = 8



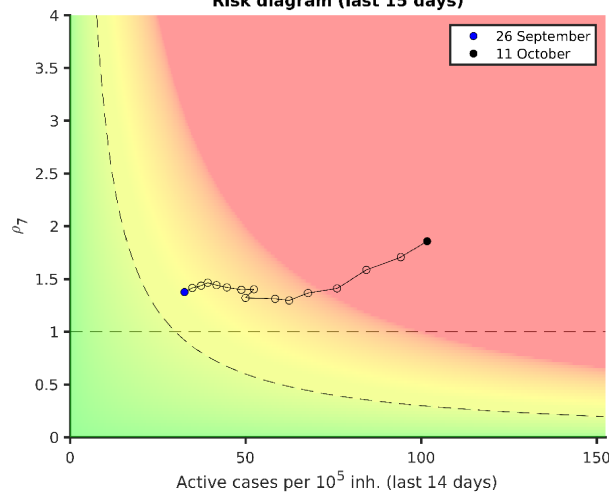
Actual $\rho_7 = 1.9$



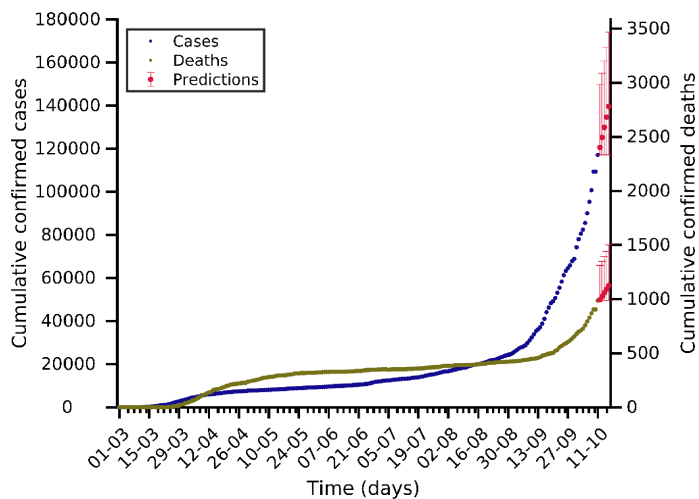
Risk diagram



Risk diagram (last 15 days)



Czech Rep 11-10-2020. Pop: 10.7M. Cumulative incidence: 1094/10⁵

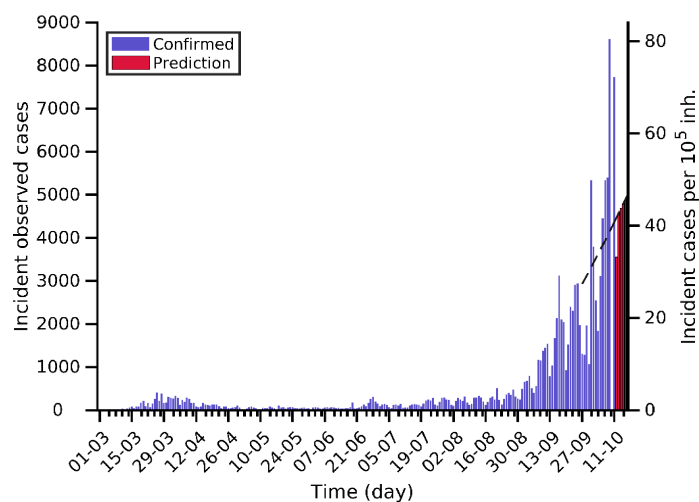


Predictions for next days

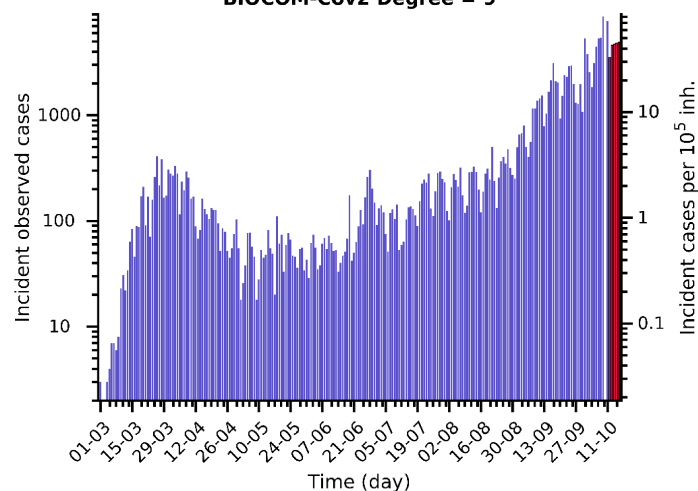
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 120663 (+3553) | [117110 - 149941] |
| 14-10-2020 | 129932 (+4688) | [117110 - 160761] |
| 16-10-2020 | 139633 (+4904) | [117110 - 174163] |

Current indicators

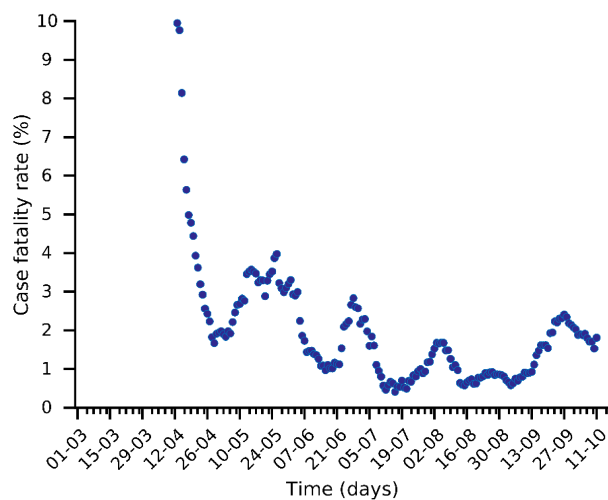
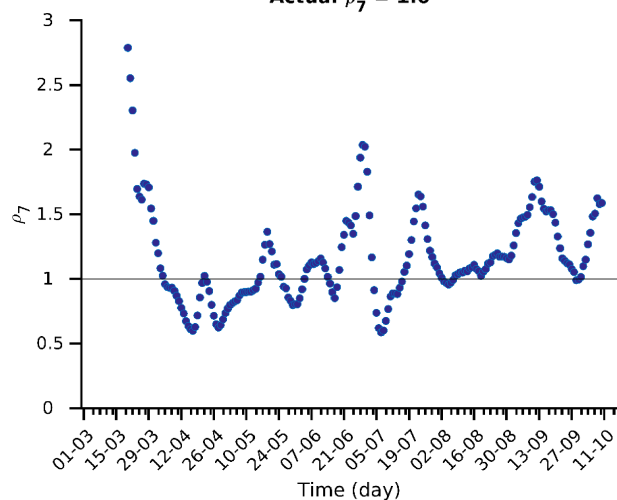
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 490 | 778 | 1.81 % |



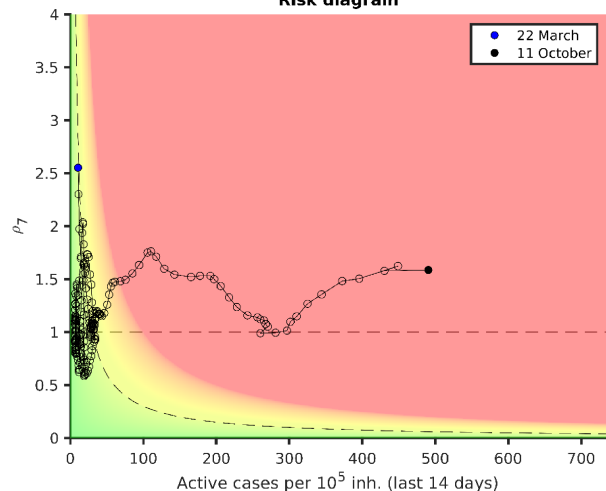
BIOCOM-Cov2 Degree = 9



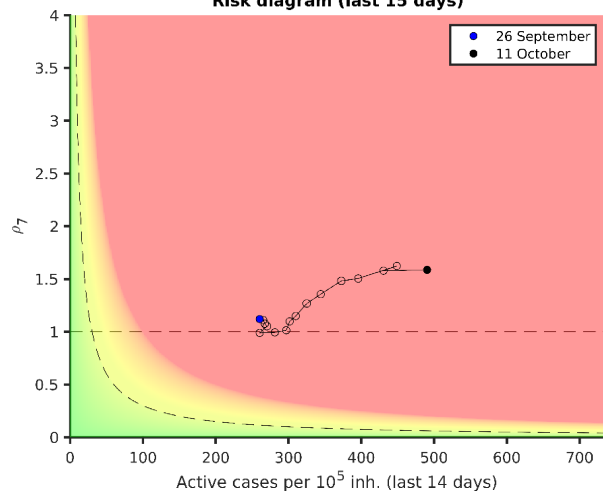
Actual $\rho_7 = 1.6$



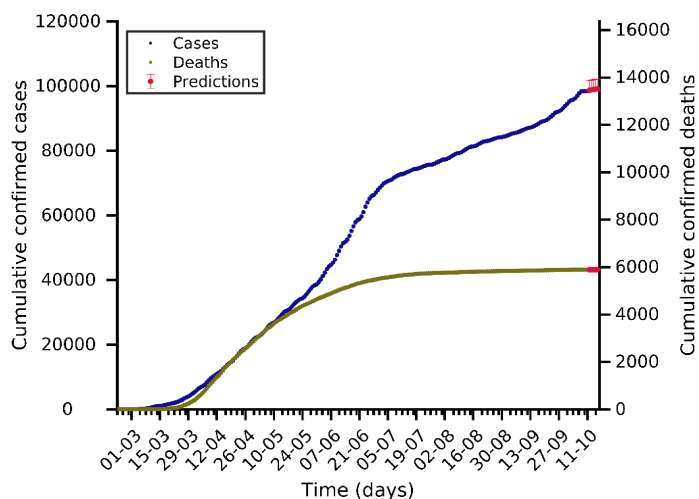
Risk diagram



Risk diagram (last 15 days)



Sweden 11-10-2020. Pop: 10.1M. Cumulative incidence: 975/10⁵

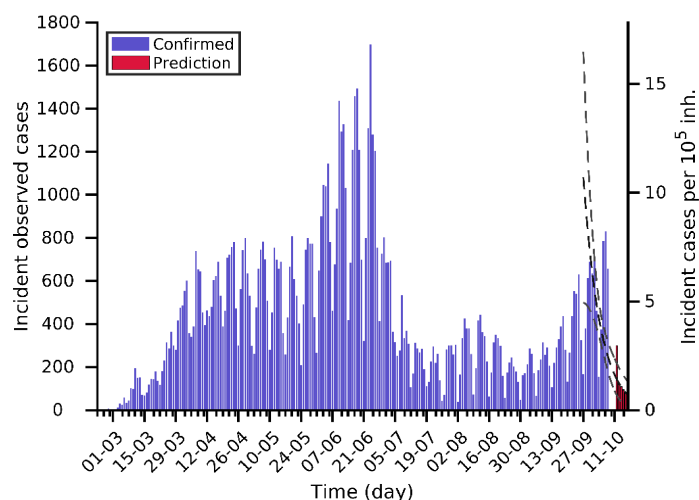


Predictions for next days

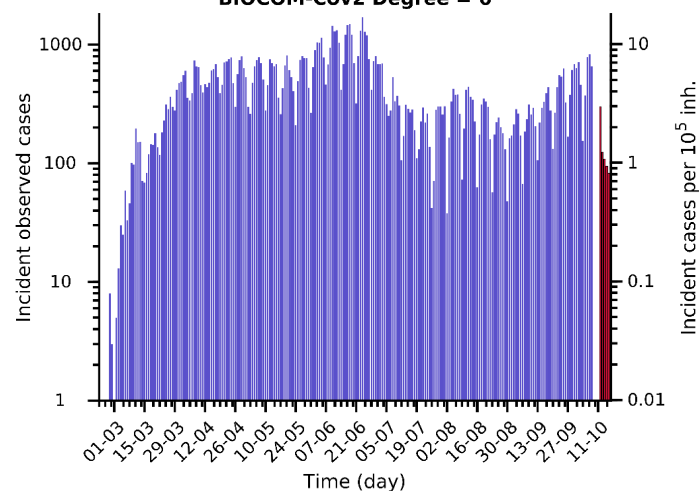
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 98752 (+301) | [98451 - 101687] |
| 14-10-2020 | 98985 (+109) | [98451 - 101954] |
| 16-10-2020 | 99161 (+82) | [98451 - 102179] |

Current indicators

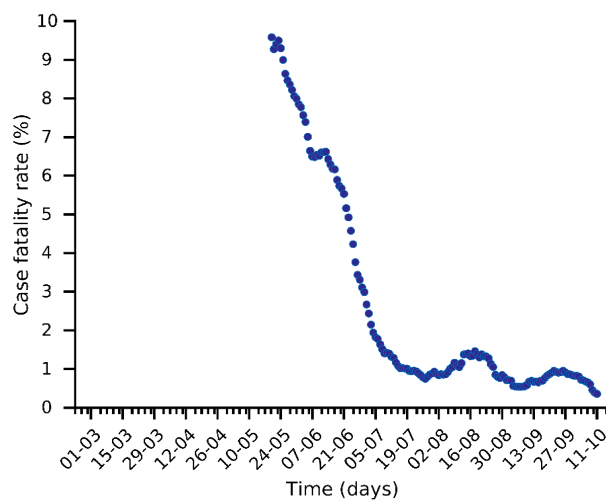
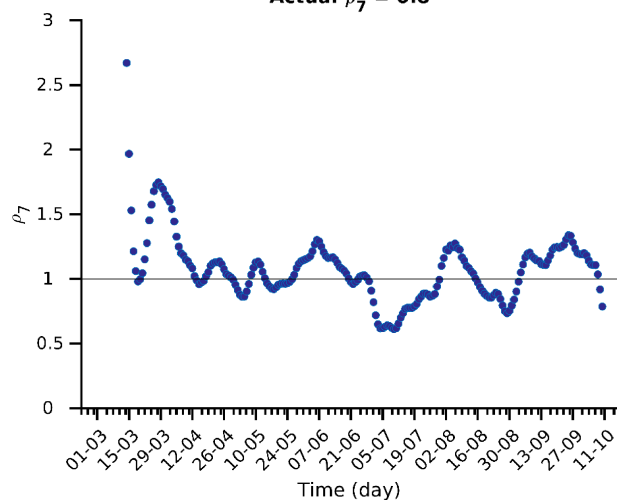
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 62 | 49 | 0.35 % |



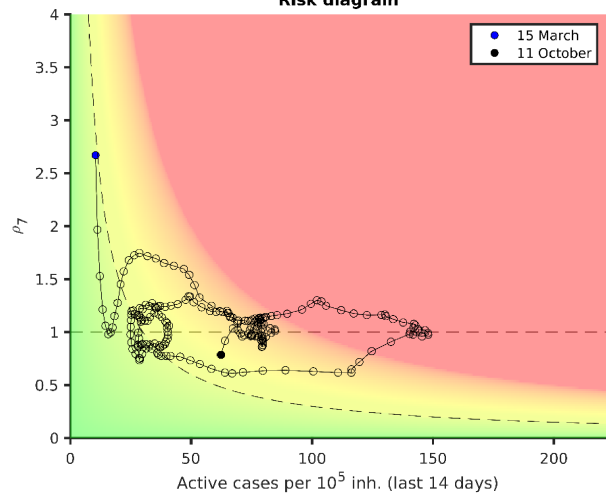
BIOCOM-Cov2 Degree = 6



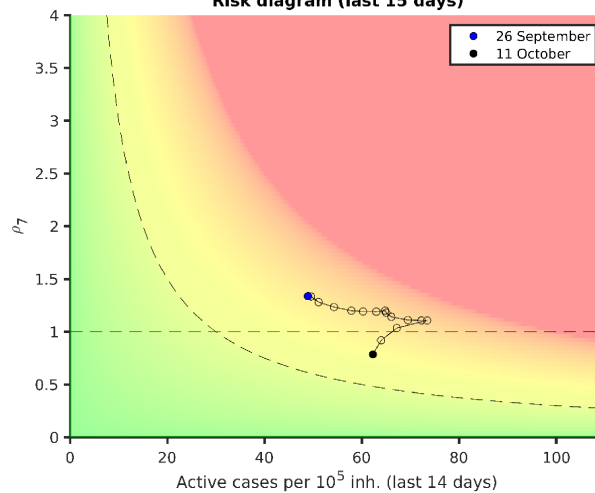
Actual $\rho_7 = 0.8$



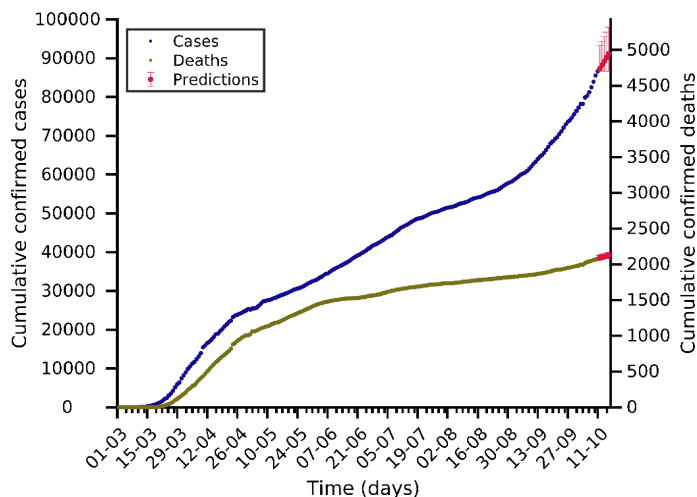
Risk diagram



Risk diagram (last 15 days)



Portugal 11-10-2020. Pop: 10.2M. Cumulative incidence: 850/10⁵

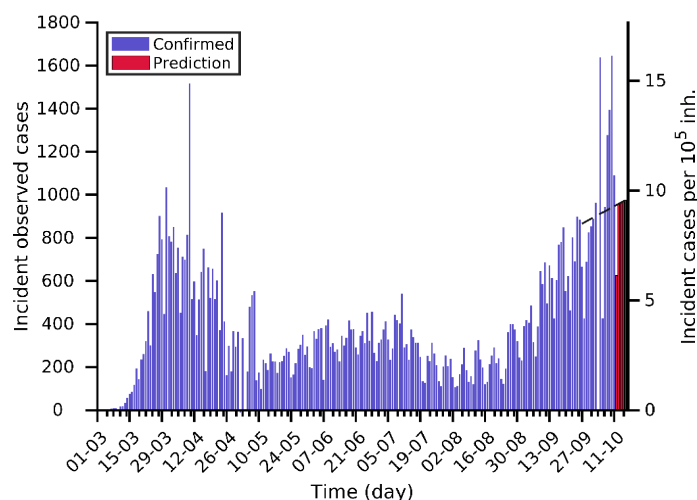


Predictions for next days

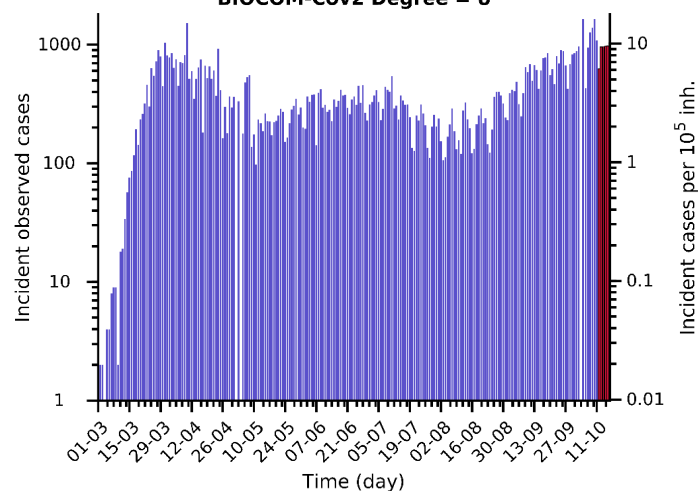
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 87290 (+626) | [86664 - 93359] |
| 14-10-2020 | 89213 (+964) | [86664 - 95537] |
| 16-10-2020 | 91158 (+976) | [86664 - 98043] |

Current indicators

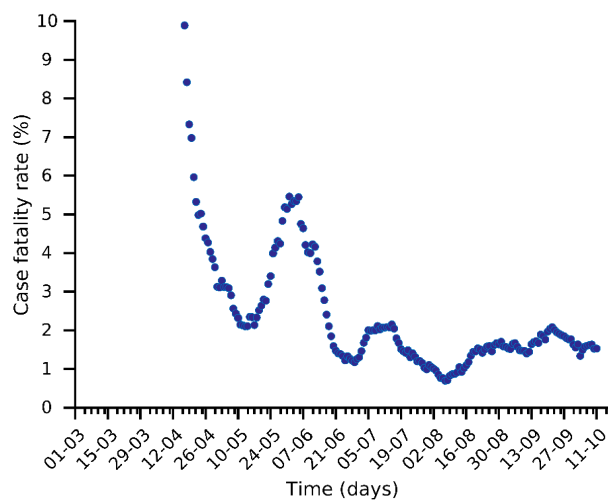
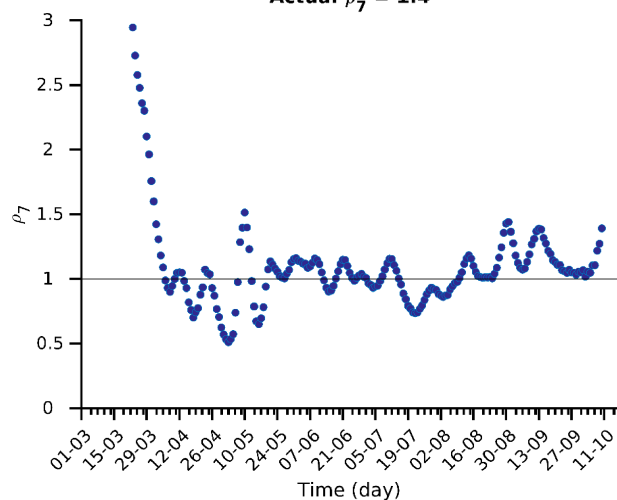
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 128 | 178 | 1.53 % |



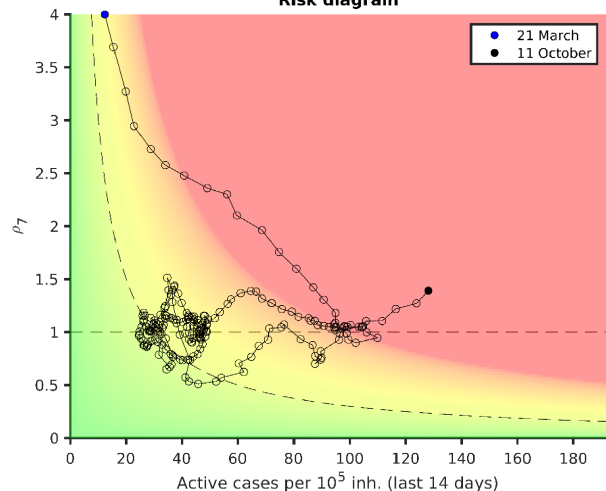
BIOCOM-Cov2 Degree = 8



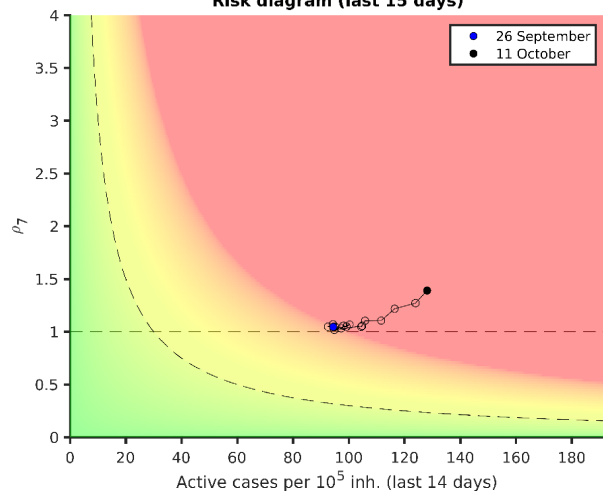
Actual $\rho_7 = 1.4$



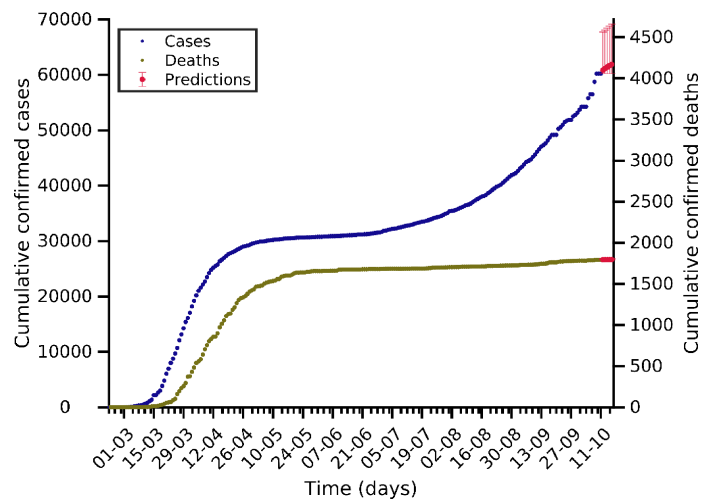
Risk diagram



Risk diagram (last 15 days)



Switzerland 11-10-2020. Pop: 8.7M. Cumulative incidence: 696/10⁵

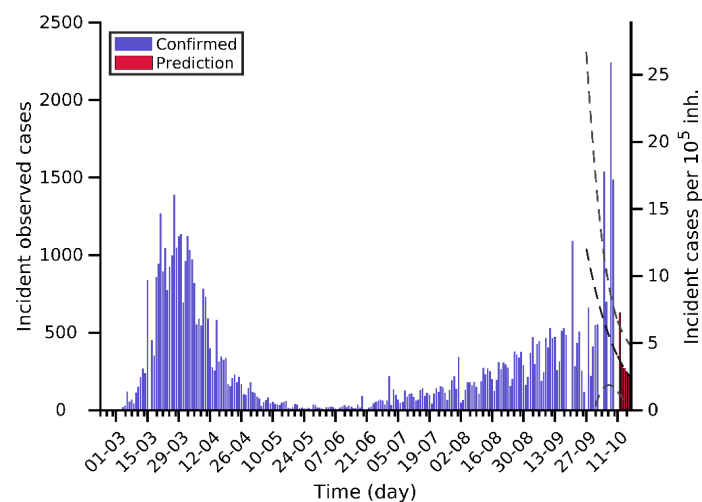


Predictions for next days

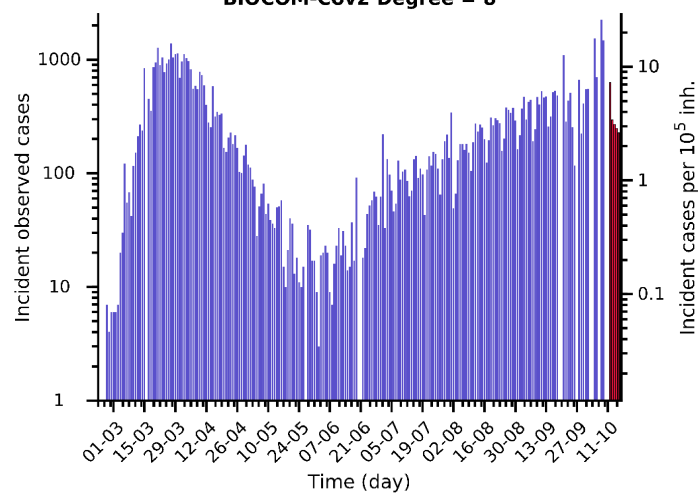
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 60860 (+630) | [60230 - 67757] |
| 14-10-2020 | 61424 (+270) | [60230 - 68460] |
| 16-10-2020 | 61900 (+228) | [60230 - 69163] |

Current indicators

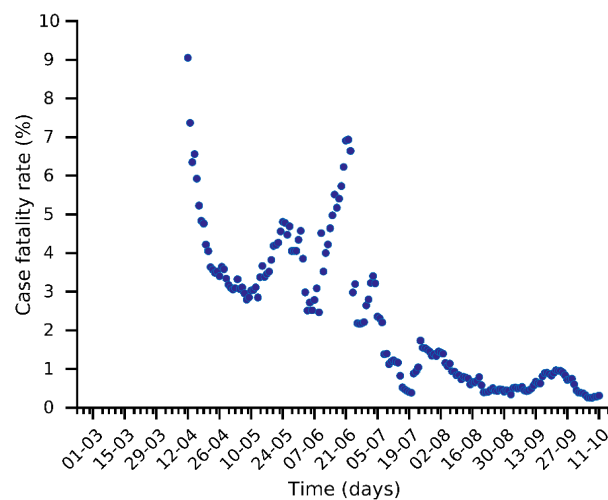
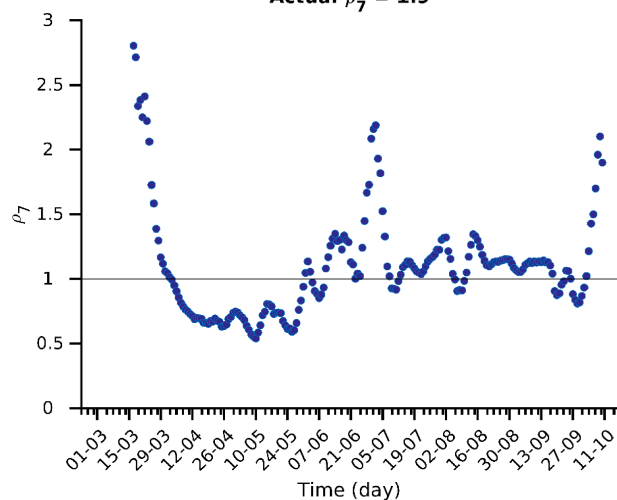
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 97 | 184 | 0.31 % |



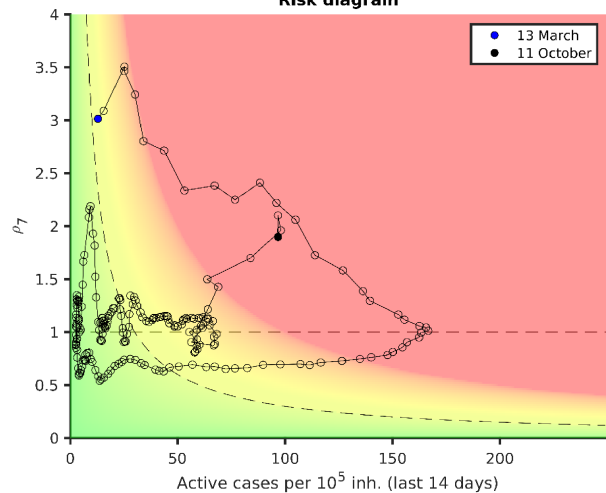
BIOCOM-Cov2 Degree = 8



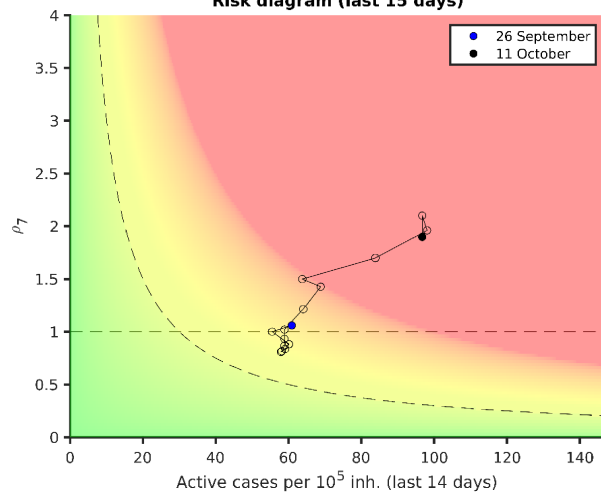
Actual $\rho_7 = 1.9$



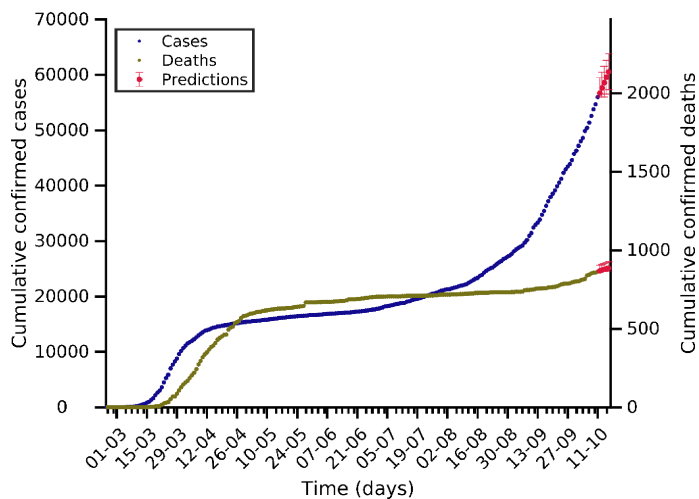
Risk diagram



Risk diagram (last 15 days)



Austria 11-10-2020. Pop: 9.0M. Cumulative incidence: 622/10⁵

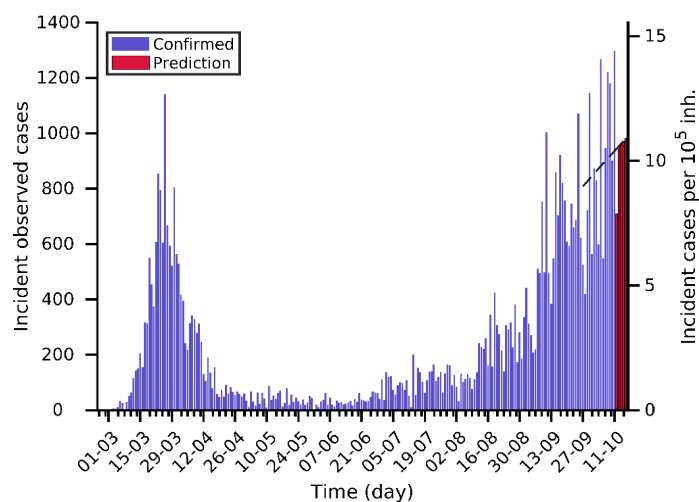


Predictions for next days

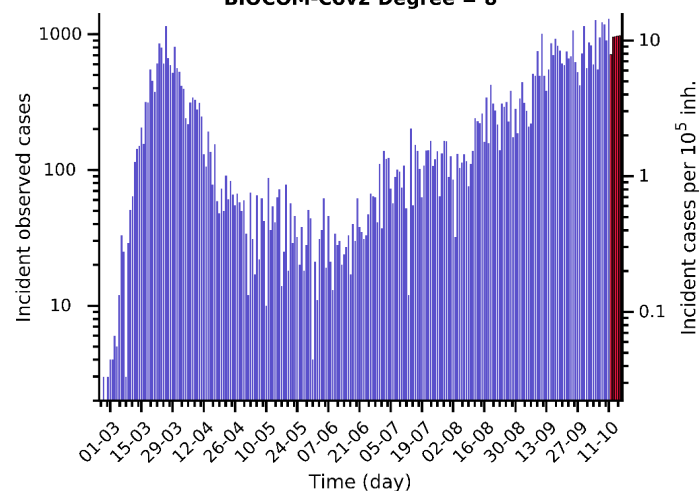
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 56692 (+709) | [55983 - 59510] |
| 14-10-2020 | 58609 (+963) | [55983 - 61551] |
| 16-10-2020 | 60561 (+981) | [57341 - 63782] |

Current indicators

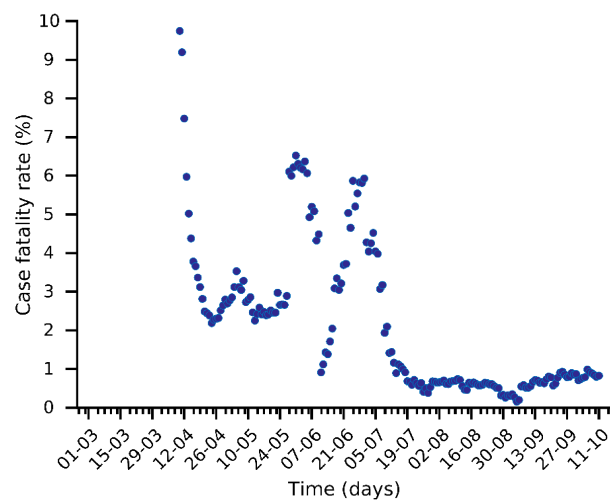
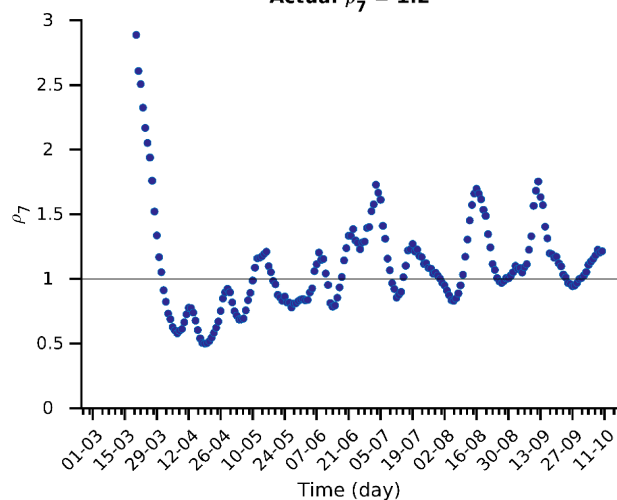
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 139 | 169 | 0.82 % |



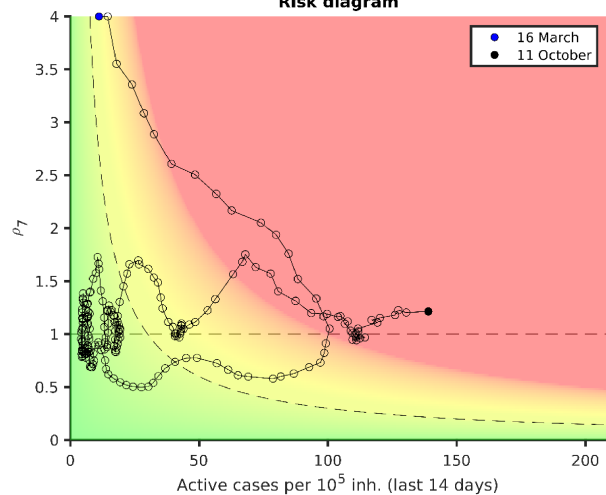
BIOCOM-Cov2 Degree = 8



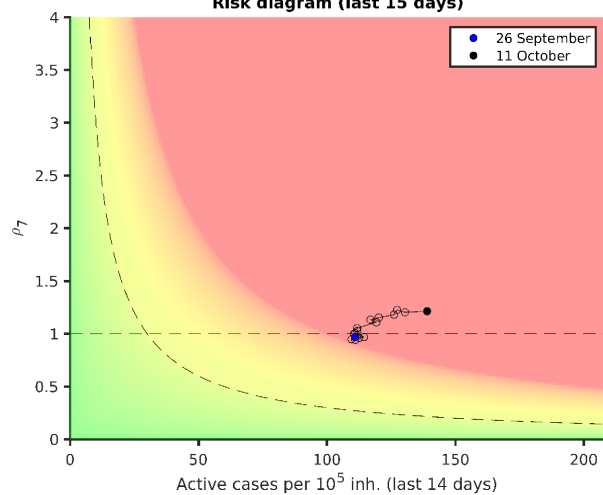
Actual $\rho_7 = 1.2$



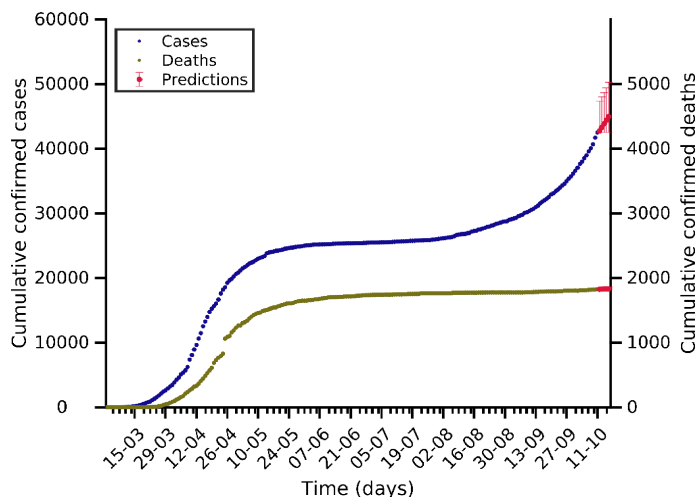
Risk diagram



Risk diagram (last 15 days)



Ireland 11-10-2020. Pop: 4.9M. Cumulative incidence: 861/10⁵

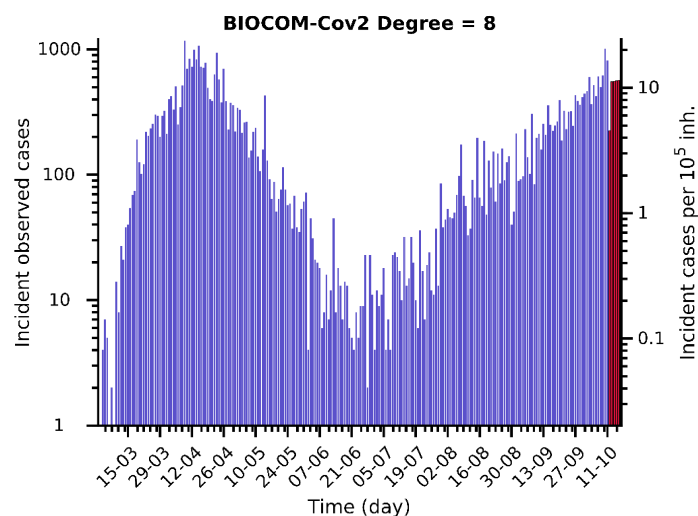
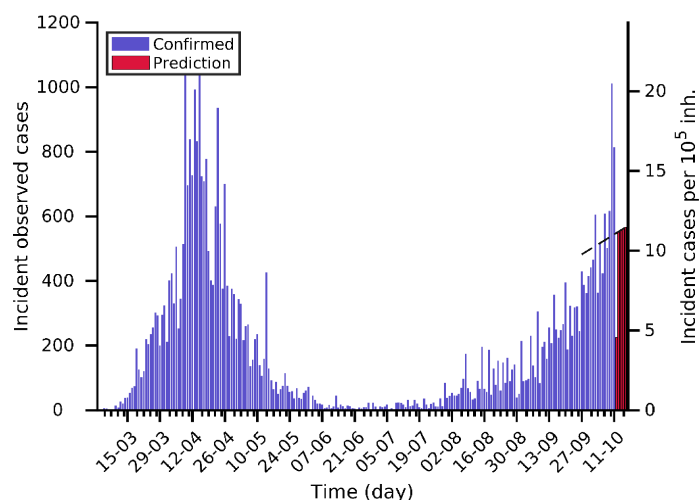


Predictions for next days

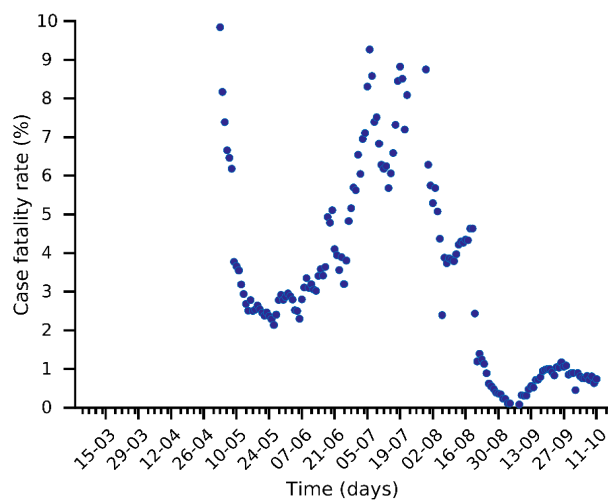
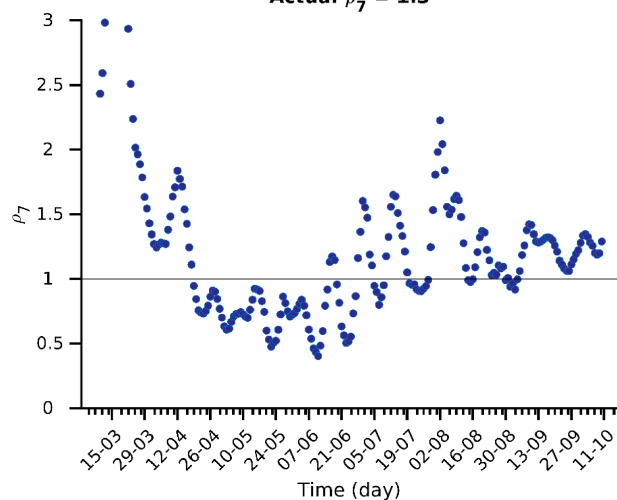
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 42753 (+225) | [42528 - 47379] |
| 14-10-2020 | 43864 (+558) | [42528 - 48688] |
| 16-10-2020 | 44992 (+566) | [42528 - 50258] |

Current indicators

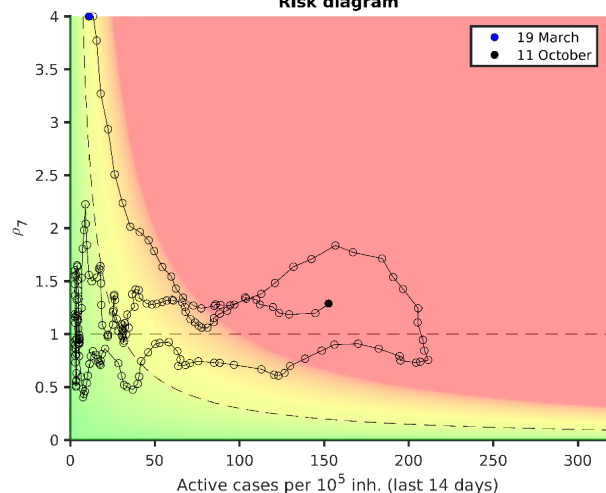
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 153 | 197 | 0.74 % |



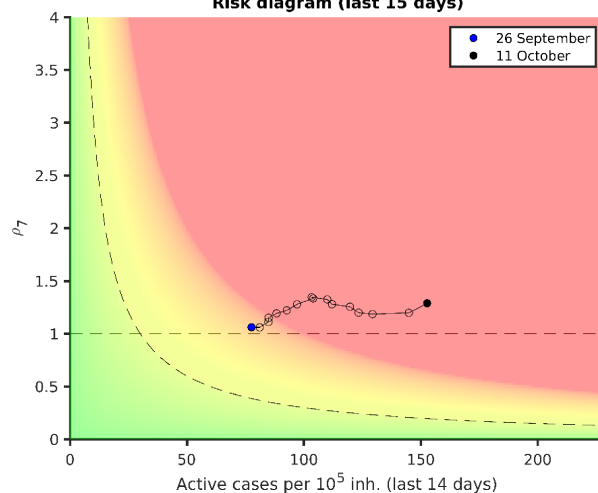
Actual $\rho_7 = 1.3$



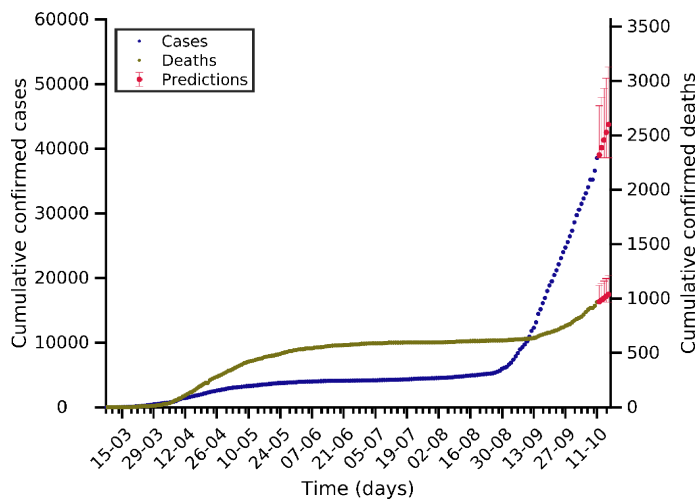
Risk diagram



Risk diagram (last 15 days)



Hungary 11-10-2020. Pop: 9.7M. Cumulative incidence: 399/10⁵

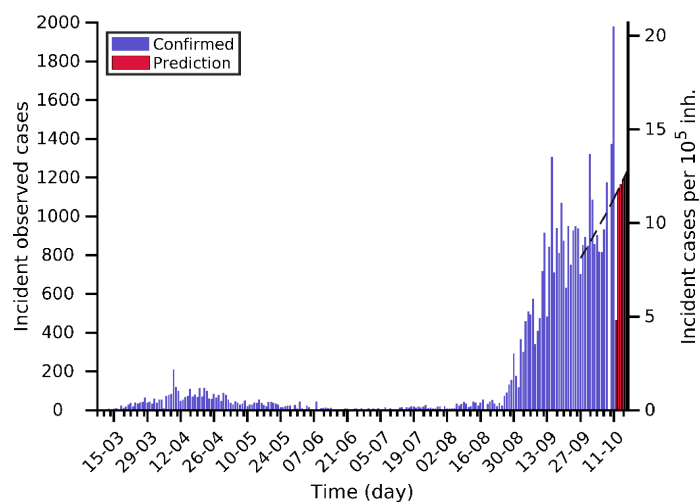


Predictions for next days

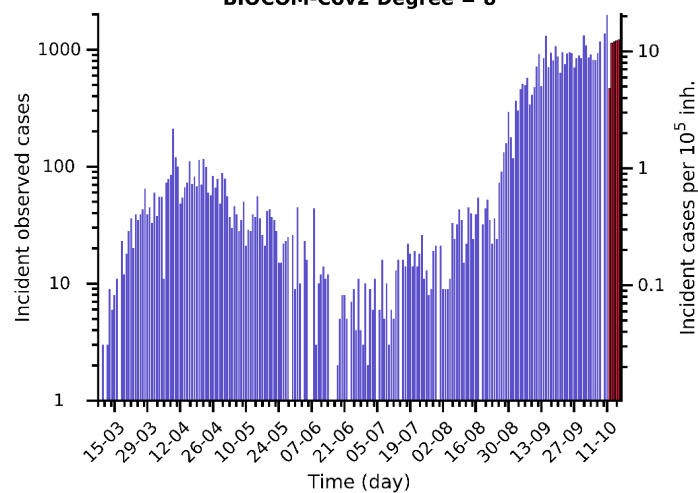
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 39042 (+465) | [38577 - 46645] |
| 14-10-2020 | 41345 (+1164) | [38577 - 49333] |
| 16-10-2020 | 43750 (+1215) | [38577 - 52640] |

Current indicators

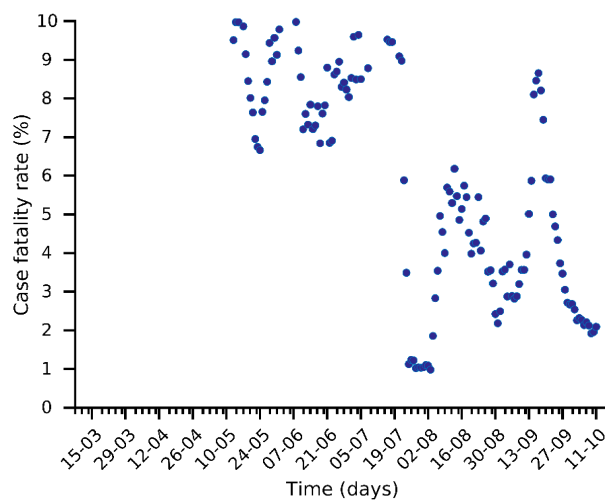
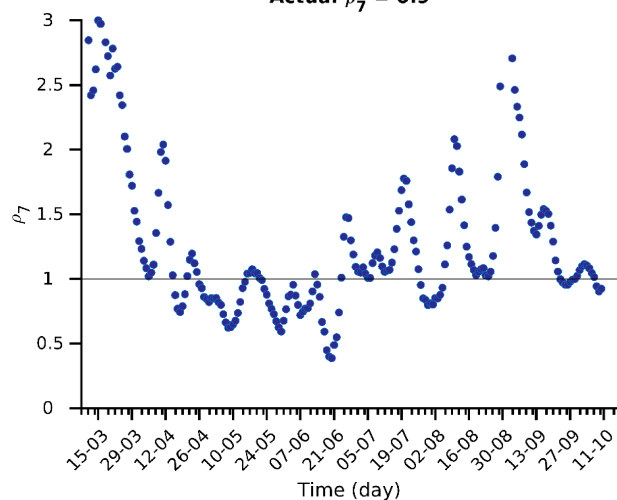
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 143 | 133 | 2.09 % |



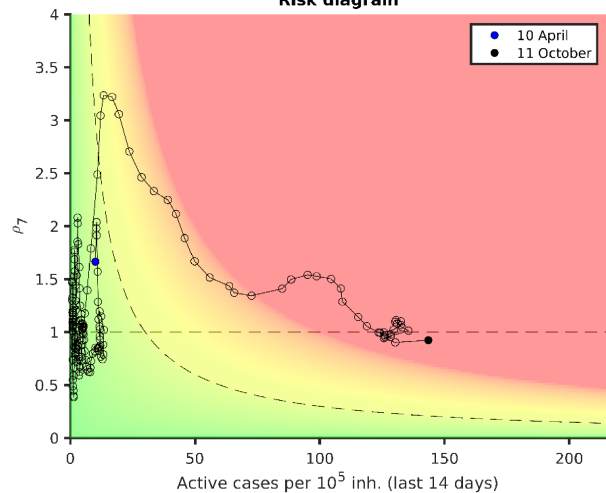
BIOCOM-Cov2 Degree = 8



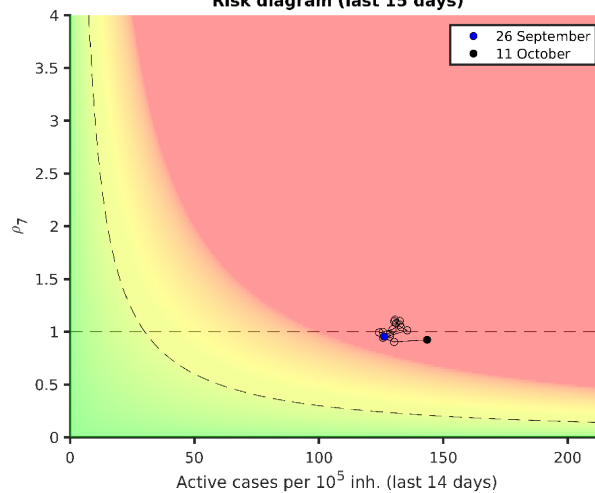
Actual $\rho_7 = 0.9$



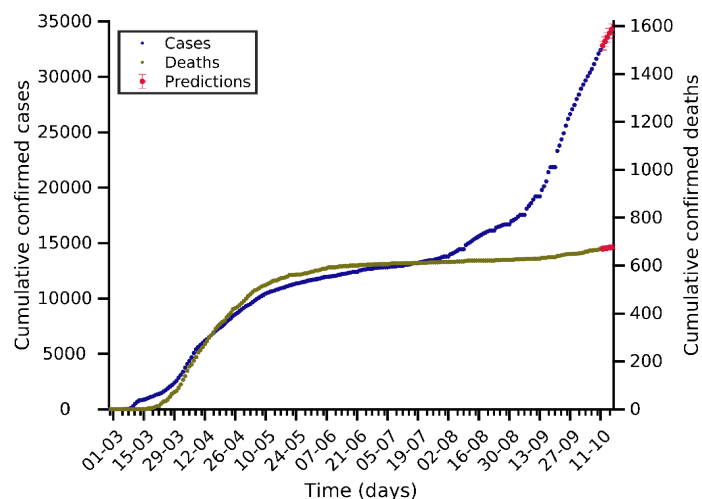
Risk diagram



Risk diagram (last 15 days)



Denmark 11-10-2020. Pop: 5.8M. Cumulative incidence: 560/10⁵

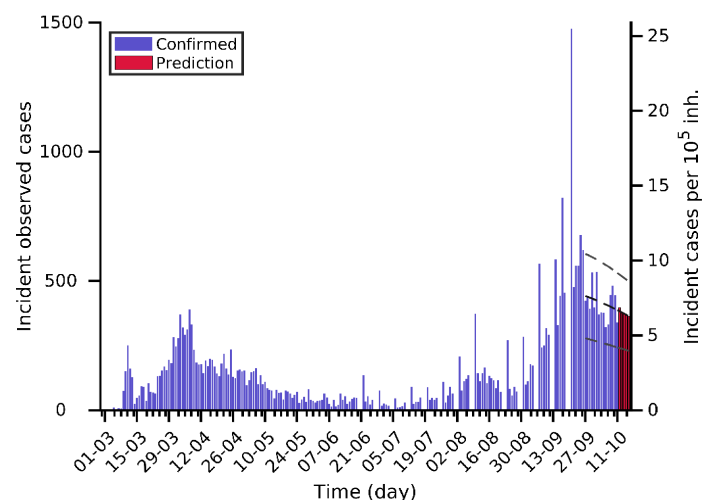


Predictions for next days

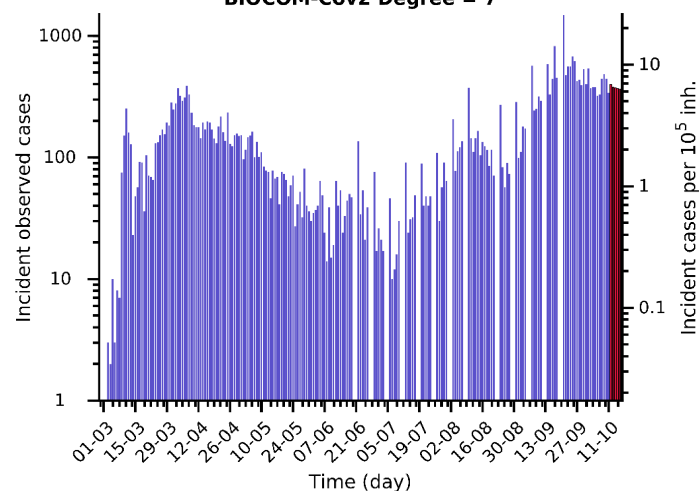
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 32818 (+396) | [32422 - 33232] |
| 14-10-2020 | 33570 (+373) | [33141 - 33999] |
| 16-10-2020 | 34303 (+364) | [33842 - 34764] |

Current indicators

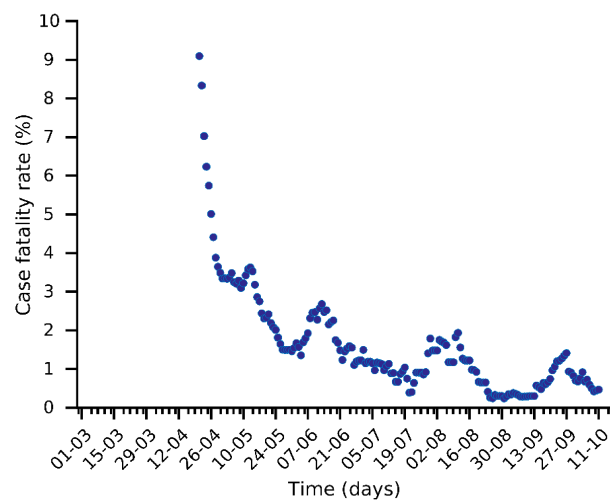
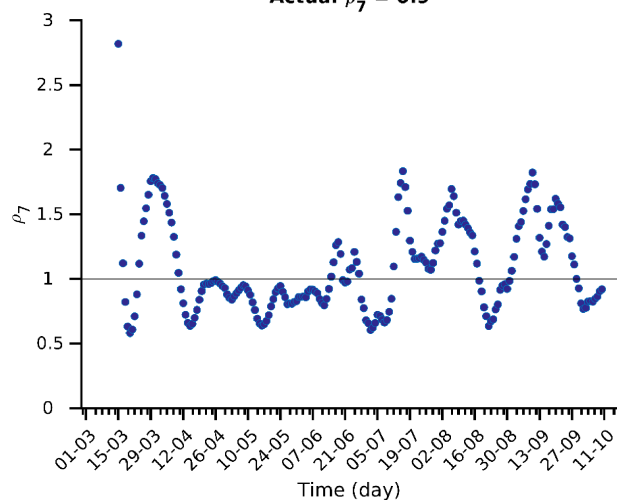
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 100 | 92 | 0.47 % |



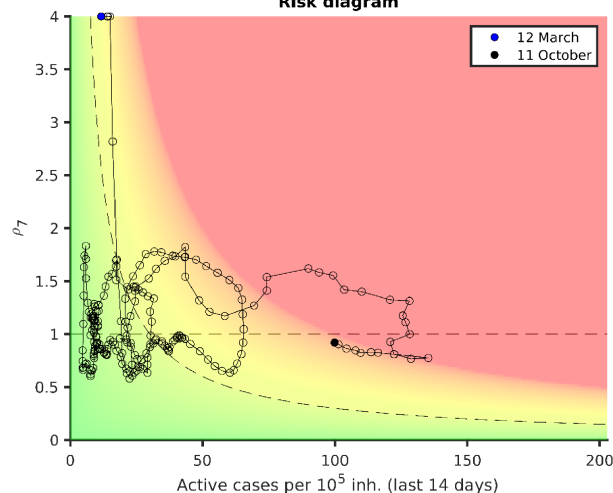
BIOCOM-Cov2 Degree = 7



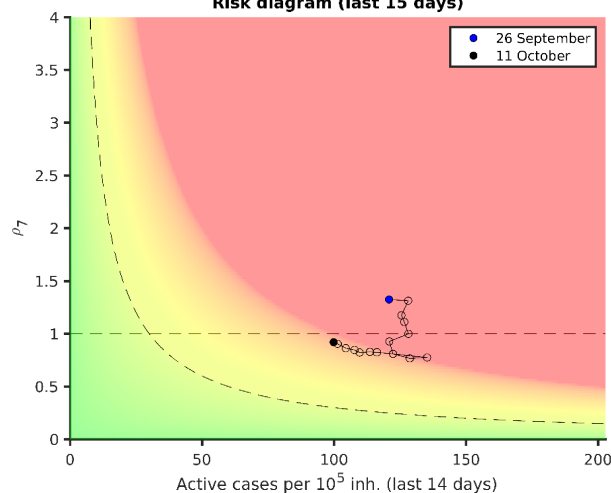
Actual $\rho_7 = 0.9$



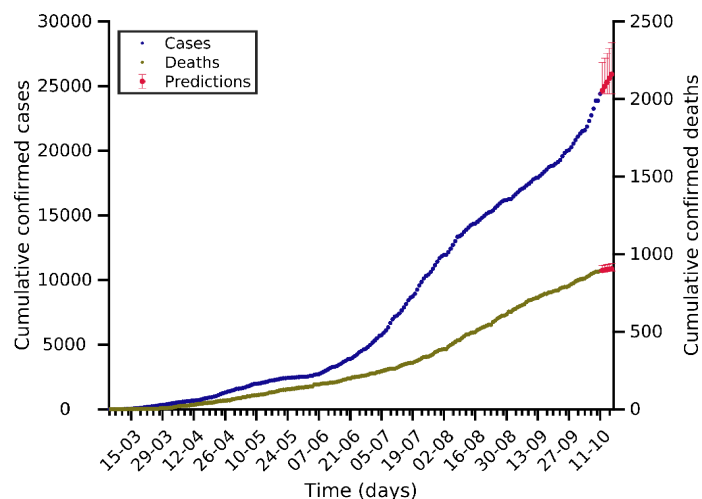
Risk diagram



Risk diagram (last 15 days)



Bulgaria 11-10-2020. Pop: 6.9M. Cumulative incidence: 351/10⁵

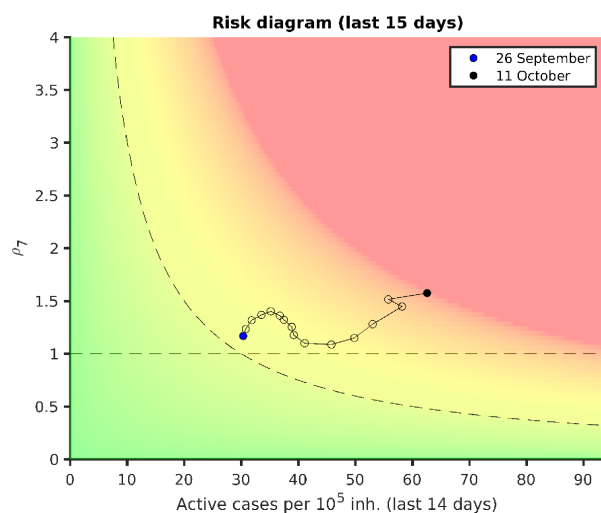
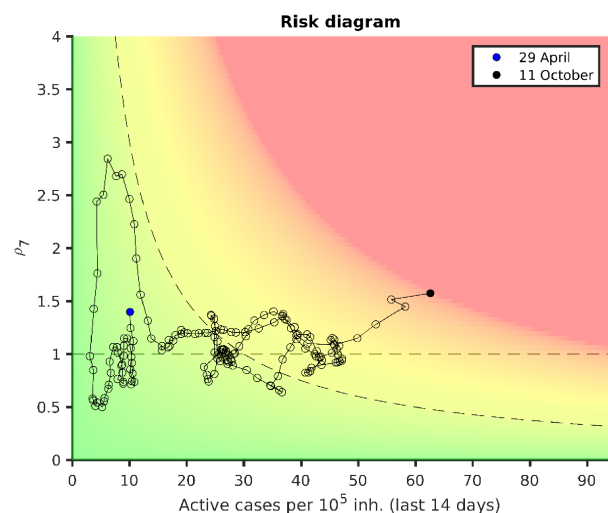
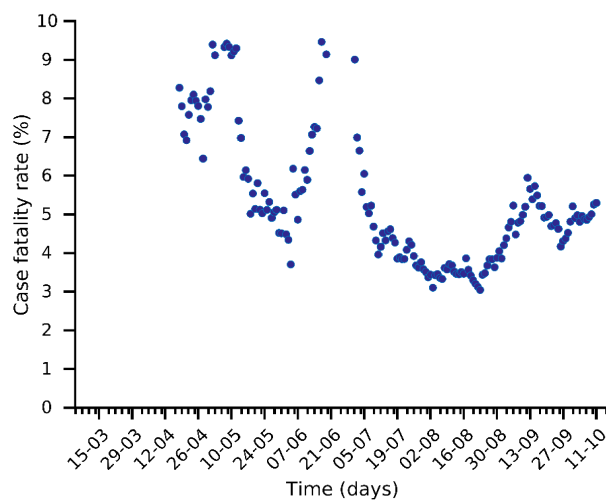
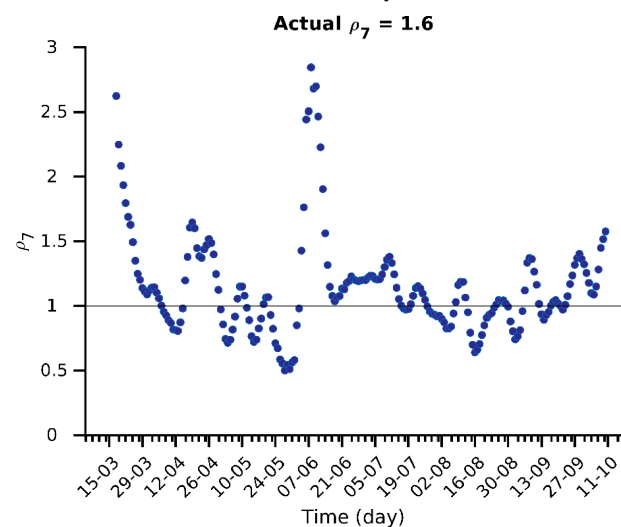
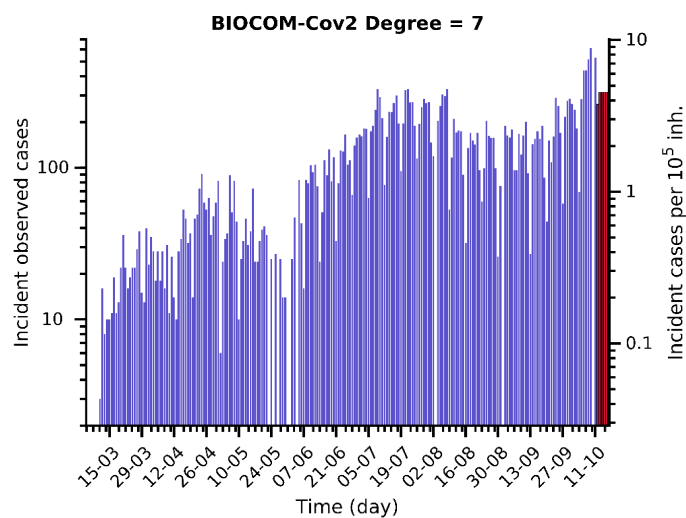
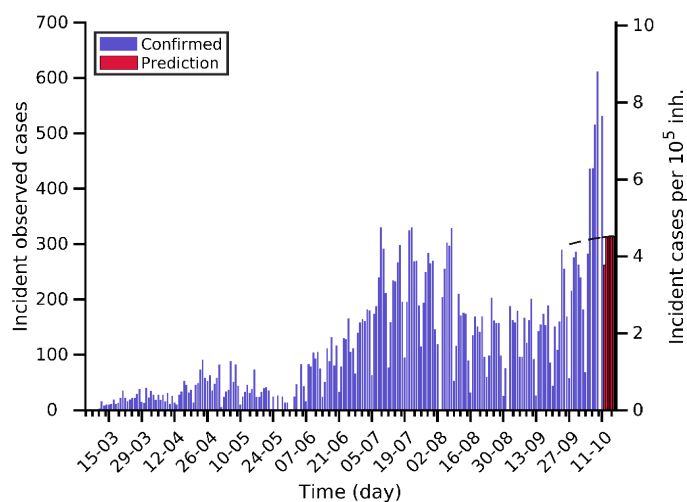


Predictions for next days

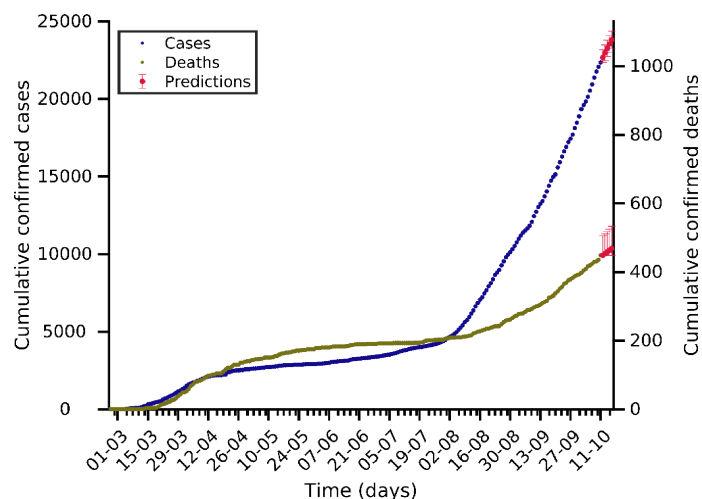
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 24664 (+262) | [24402 - 26822] |
| 14-10-2020 | 25290 (+314) | [24402 - 27537] |
| 16-10-2020 | 25919 (+314) | [24402 - 28358] |

Current indicators

| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 63 | 99 | 5.30 % |



Greece 11-10-2020. Pop: 10.4M. Cumulative incidence: 215/10⁵

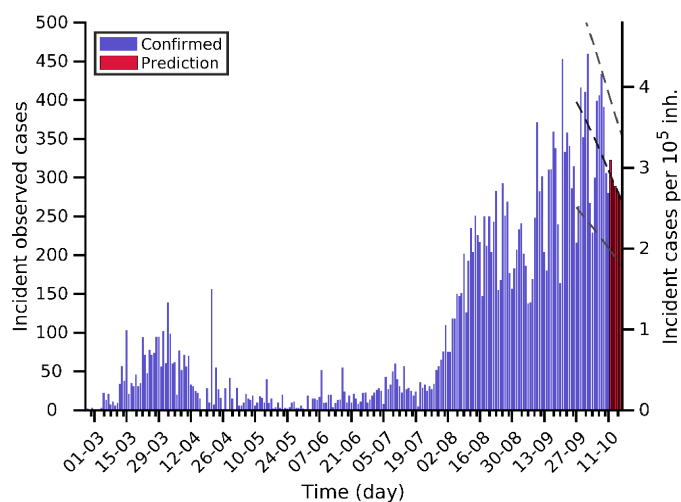


Predictions for next days

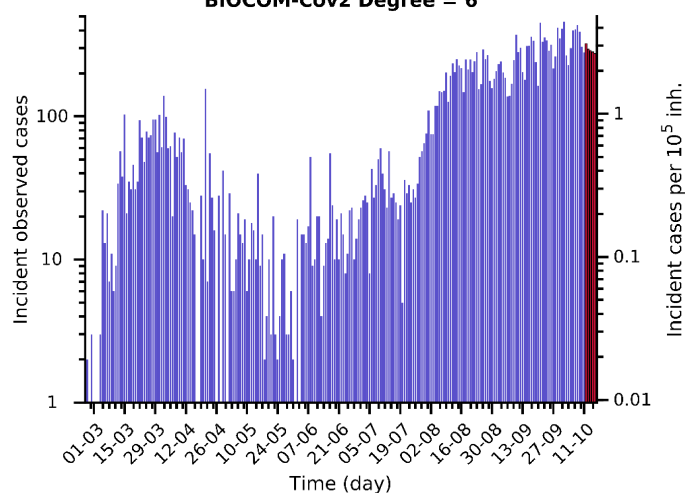
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 22680 (+322) | [22358 - 23182] |
| 14-10-2020 | 23265 (+289) | [22746 - 23785] |
| 16-10-2020 | 23823 (+276) | [23269 - 24377] |

Current indicators

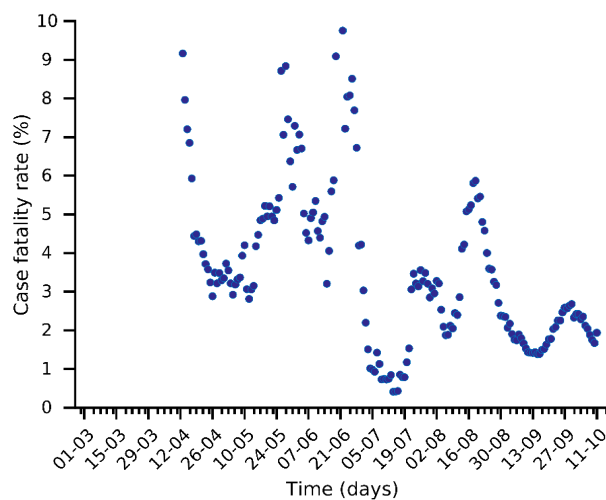
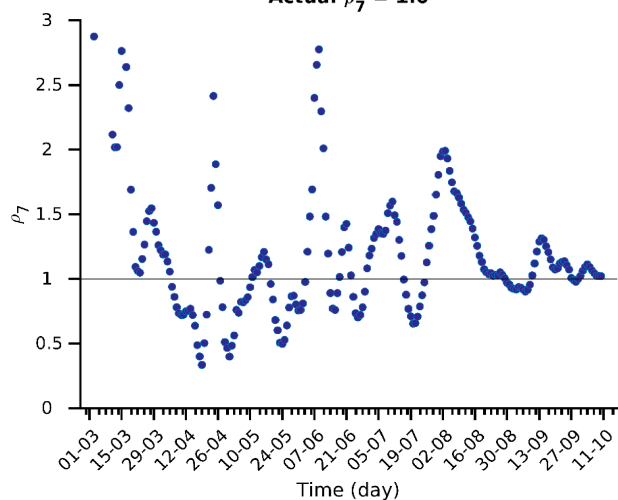
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 47 | 48 | 1.93 % |



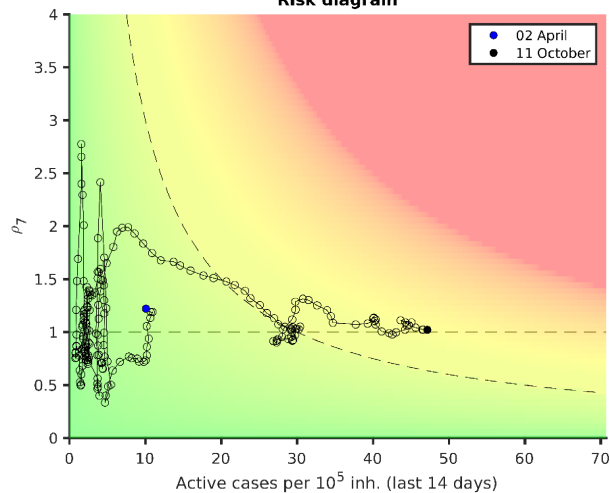
BIOCOM-Cov2 Degree = 6



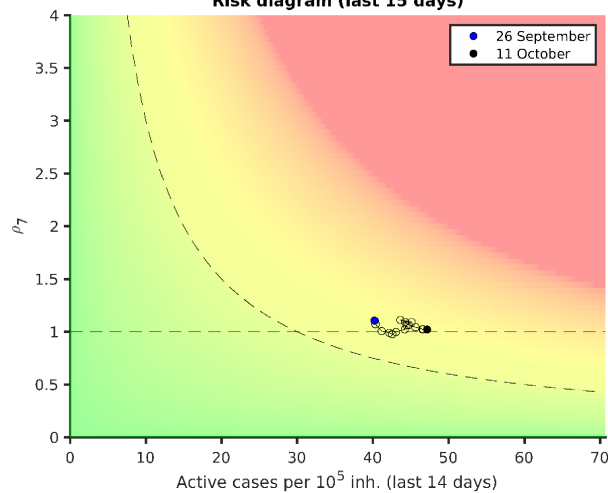
Actual $\rho_7 = 1.0$



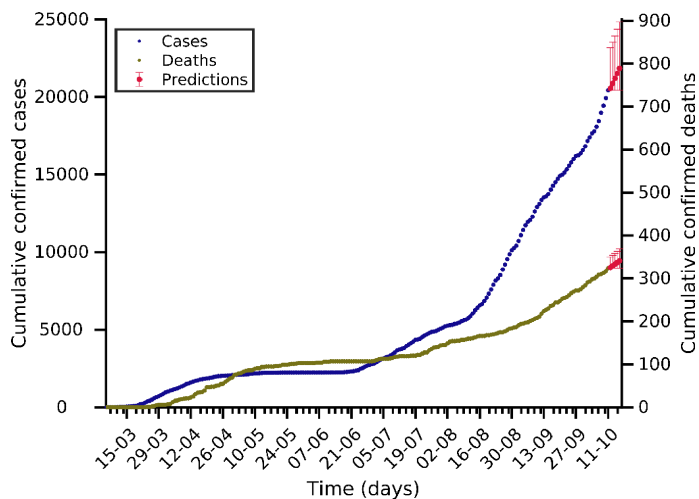
Risk diagram



Risk diagram (last 15 days)



Croatia 11-10-2020. Pop: 4.1M. Cumulative incidence: 498/10⁵

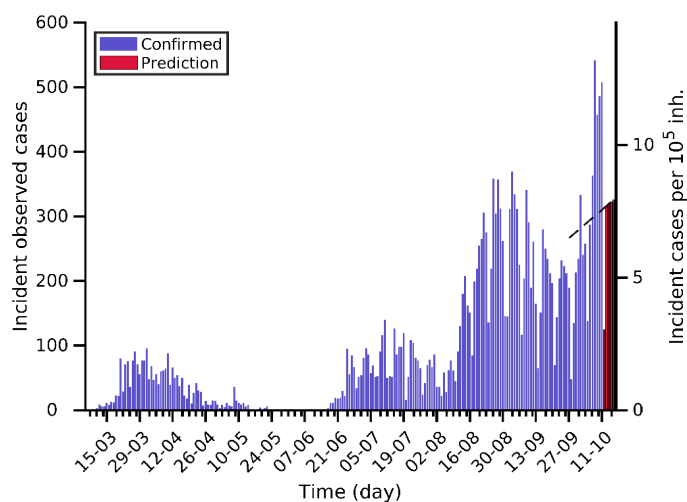


Predictions for next days

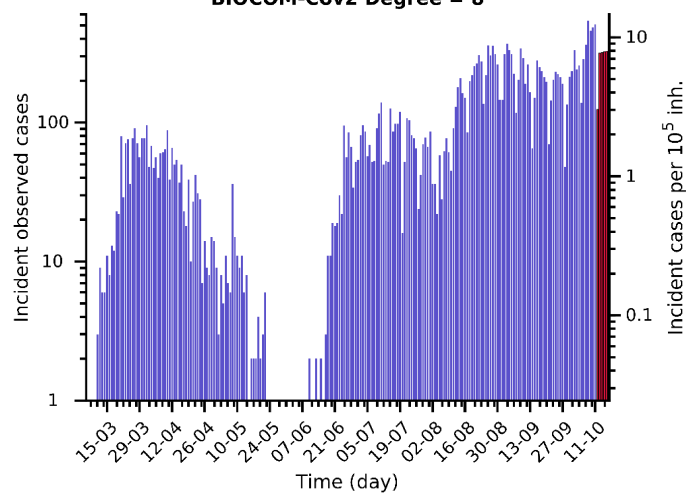
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 20564 (+124) | [20440 - 23185] |
| 14-10-2020 | 21200 (+320) | [20440 - 23937] |
| 16-10-2020 | 21849 (+326) | [20440 - 24844] |

Current indicators

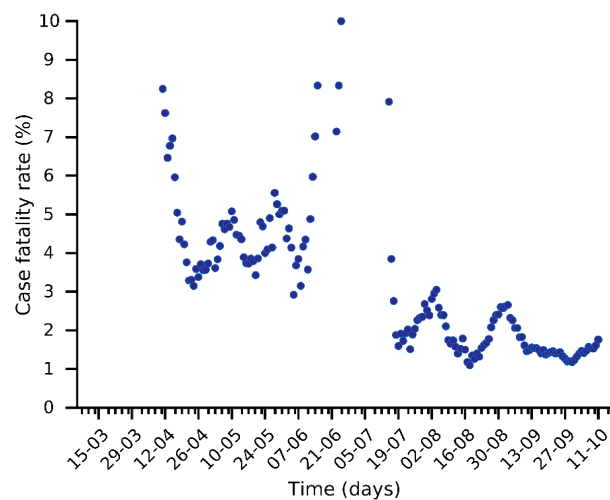
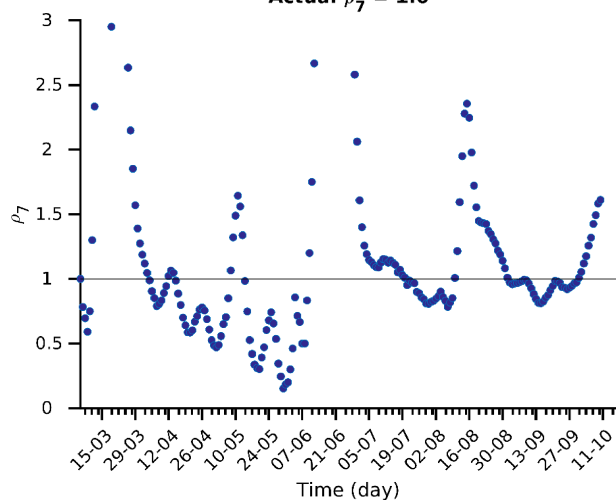
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 103 | 166 | 1.76 % |



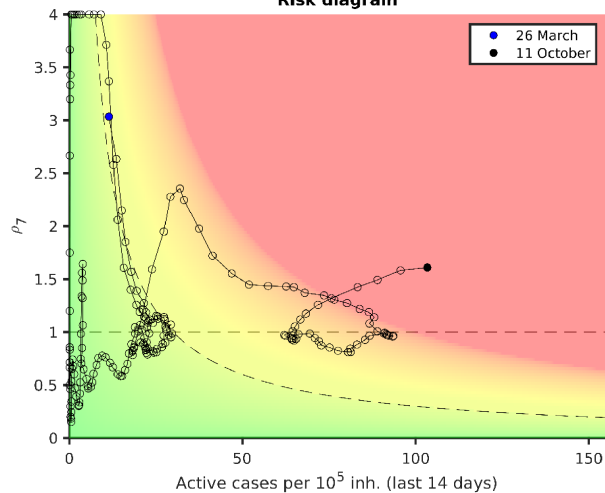
BIOCOM-Cov2 Degree = 8



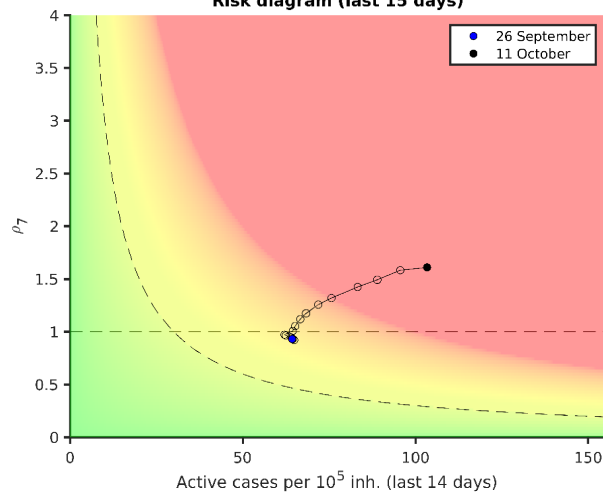
Actual $\rho_7 = 1.6$



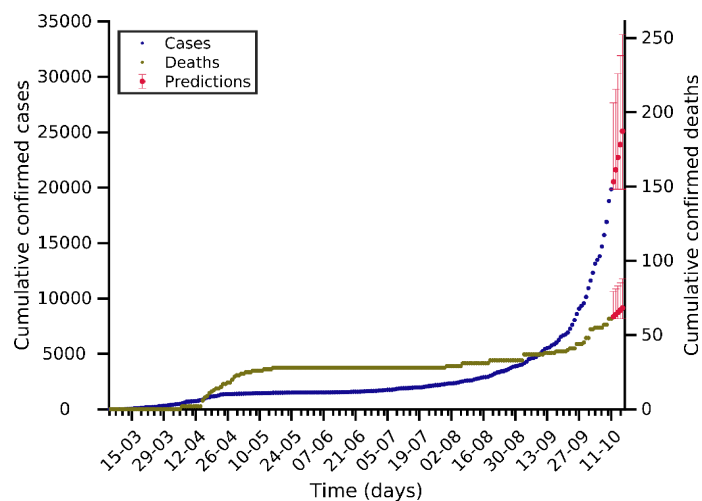
Risk diagram



Risk diagram (last 15 days)



Slovakia 11-10-2020. Pop: 5.5M. Cumulative incidence: 364/10⁵

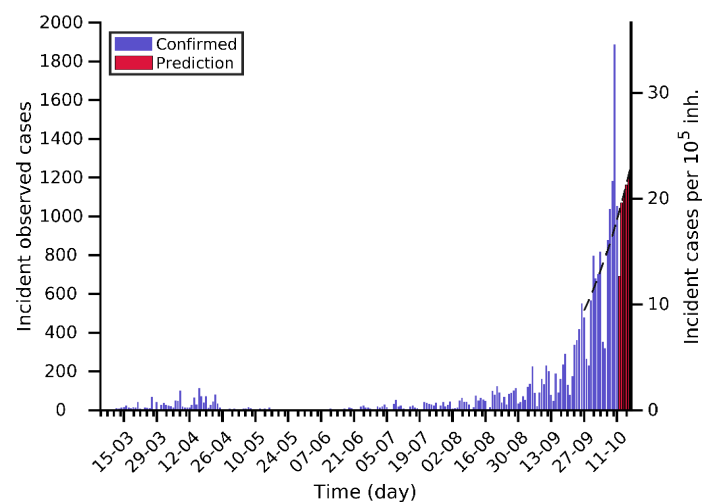


Predictions for next days

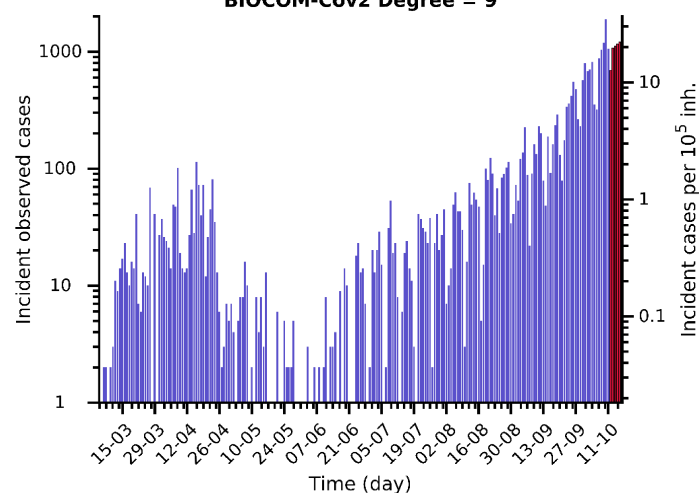
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 20542 (+691) | [19851 - 27659] |
| 14-10-2020 | 22727 (+1115) | [19851 - 30291] |
| 16-10-2020 | 25100 (+1211) | [19851 - 33805] |

Current indicators

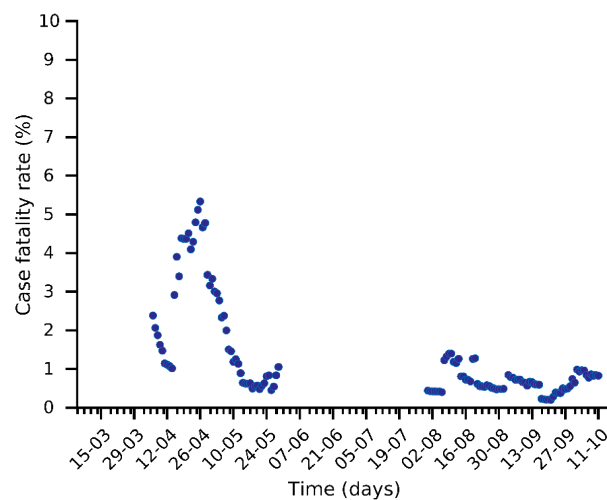
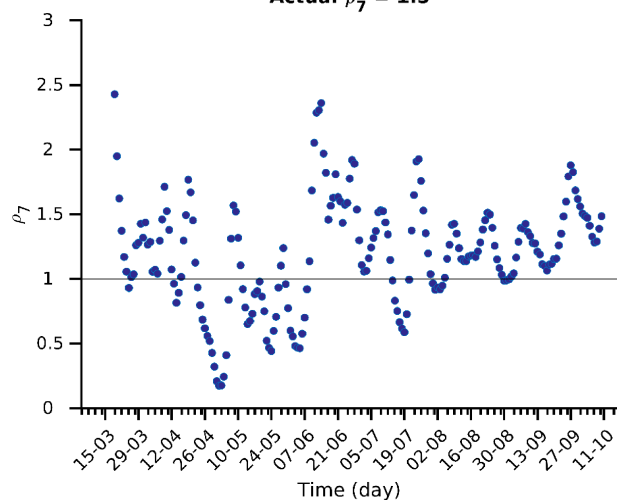
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 197 | 293 | 0.82 % |



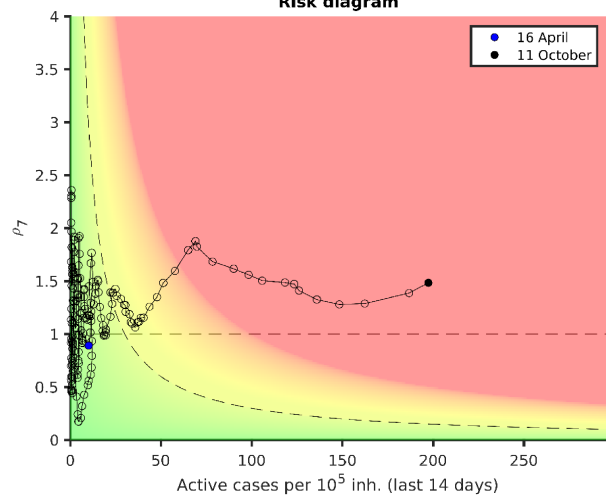
BIOCOM-Cov2 Degree = 9



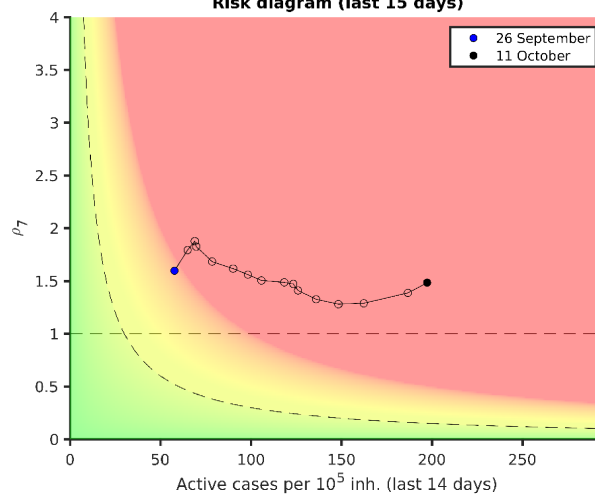
Actual $\rho_7 = 1.5$



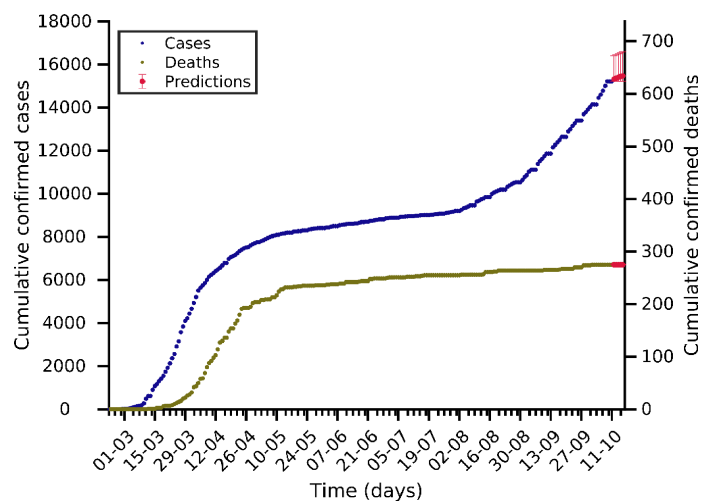
Risk diagram



Risk diagram (last 15 days)



Norway 11-10-2020. Pop: 5.4M. Cumulative incidence: 281/10⁵

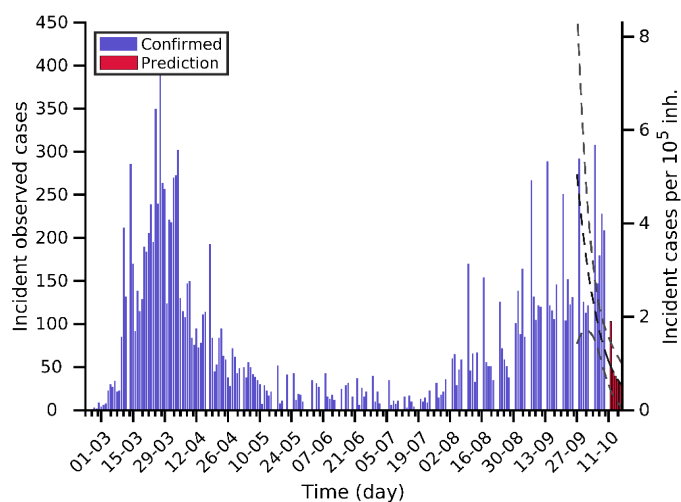


Predictions for next days

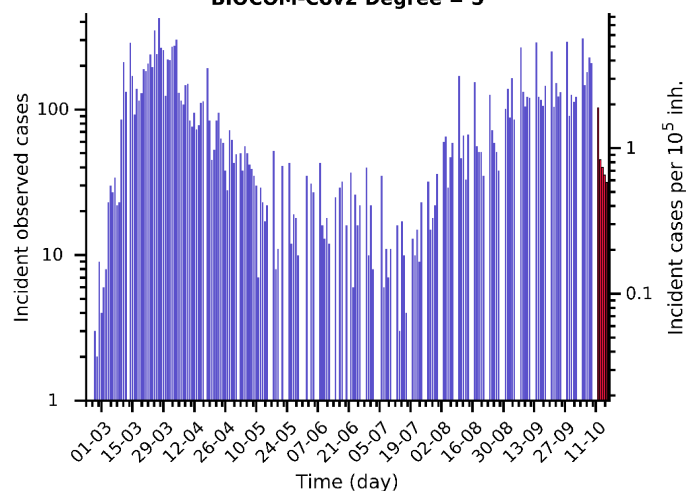
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 15324 (+103) | [15221 - 16401] |
| 14-10-2020 | 15409 (+40) | [15221 - 16502] |
| 16-10-2020 | 15476 (+31) | [15221 - 16592] |

Current indicators

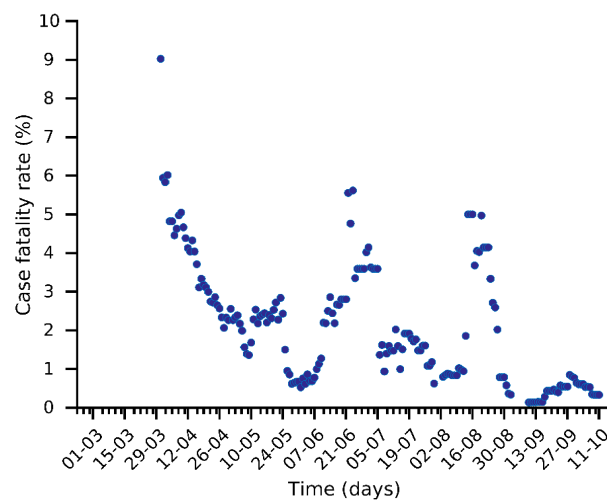
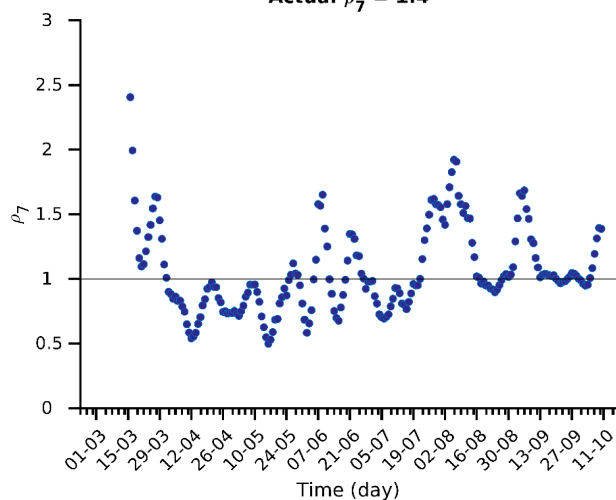
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 33 | 46 | 0.33 % |



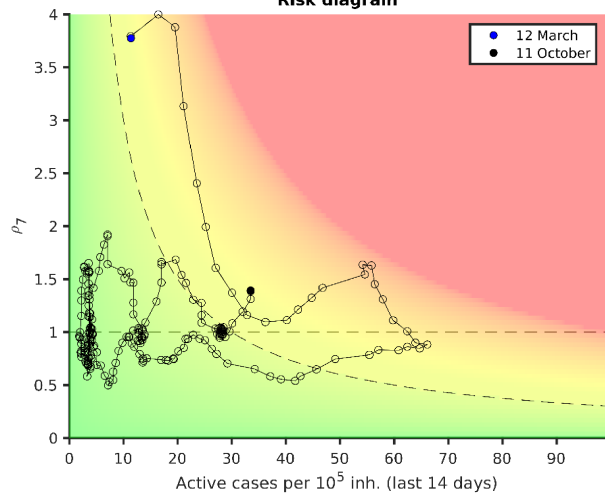
BIOCOM-Cov2 Degree = 5



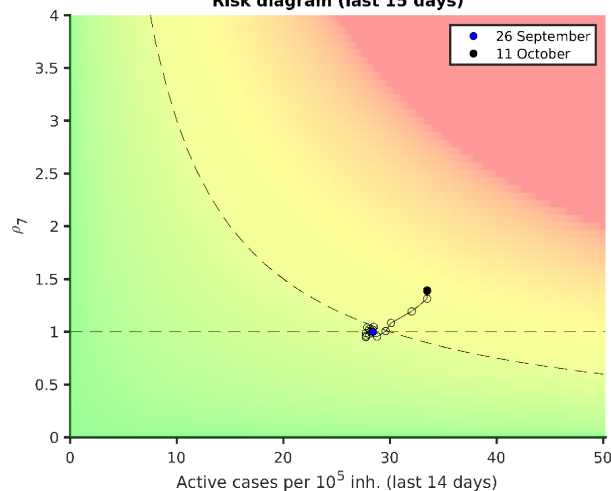
Actual $\rho_7 = 1.4$



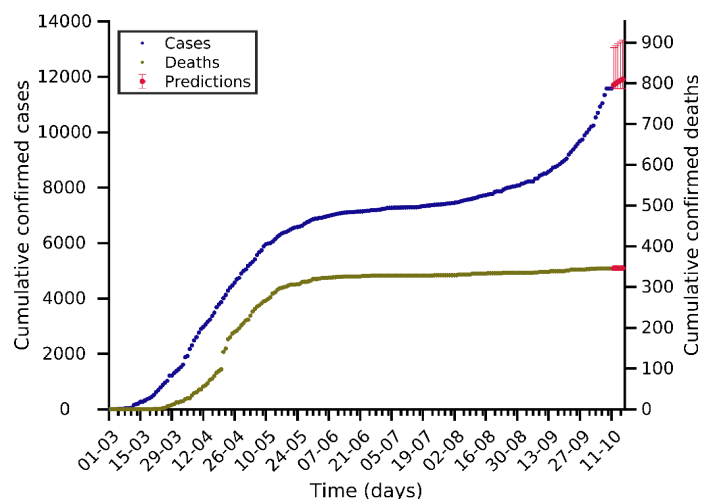
Risk diagram



Risk diagram (last 15 days)



Finland 11-10-2020. Pop: 5.5M. Cumulative incidence: 209/10⁵

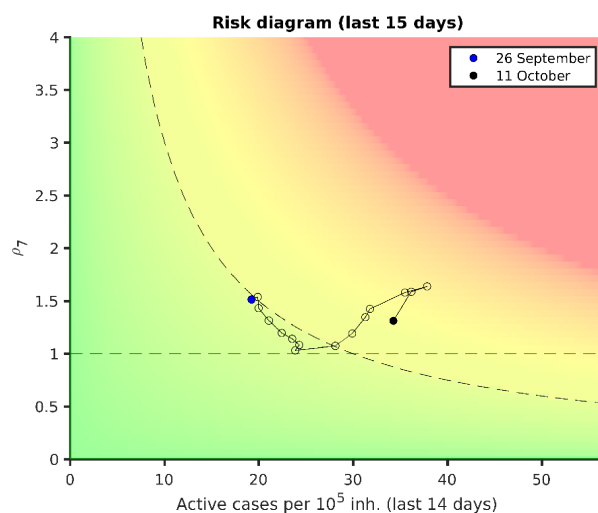
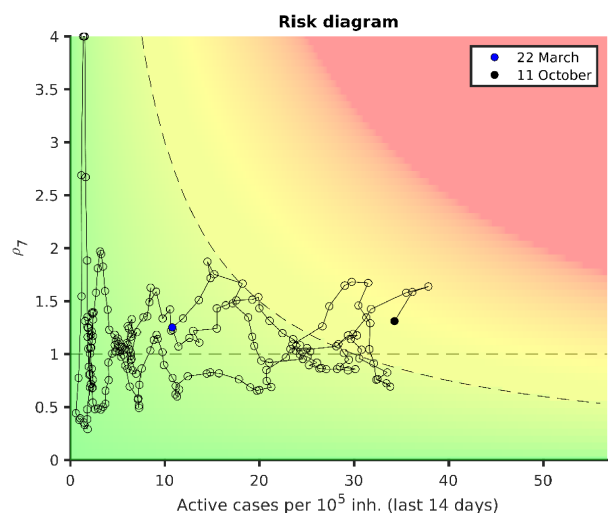
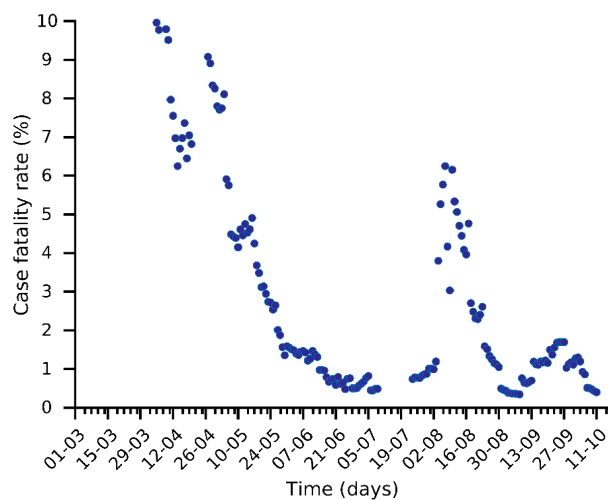
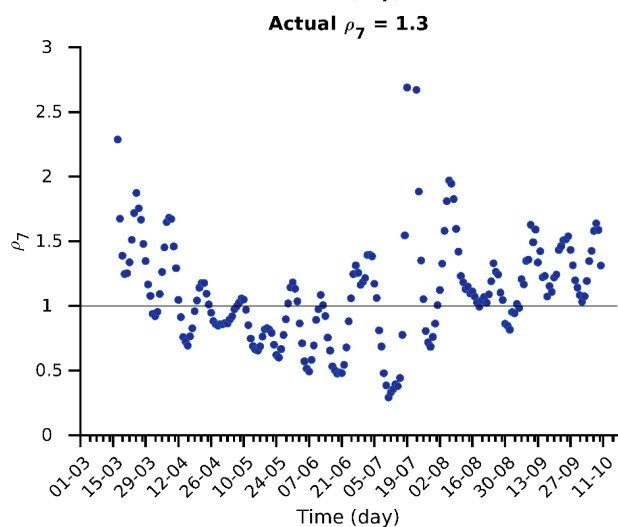
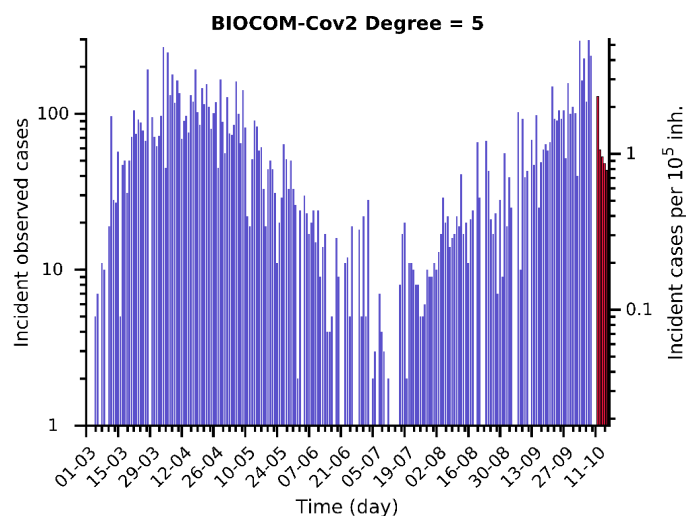
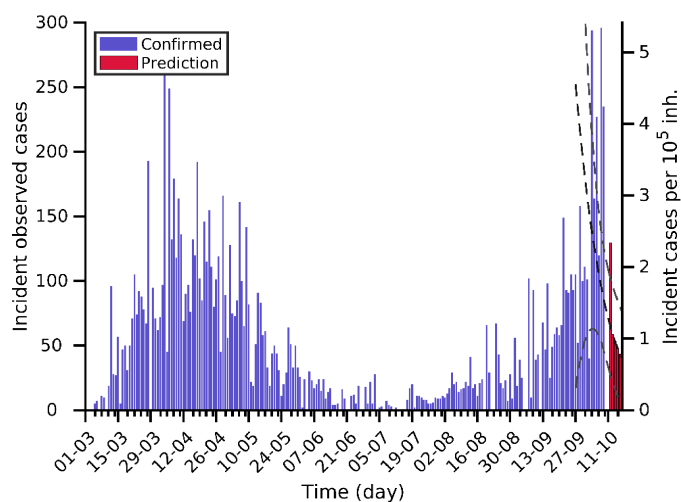


Predictions for next days

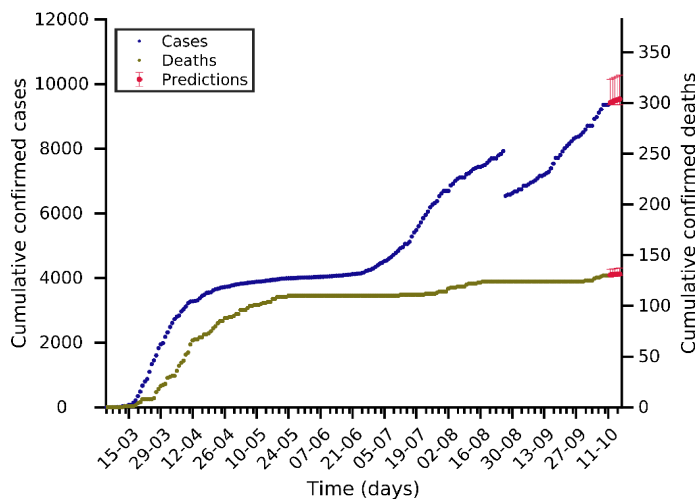
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 11710 (+130) | [11580 - 13058] |
| 14-10-2020 | 11821 (+53) | [11580 - 13194] |
| 16-10-2020 | 11912 (+43) | [11580 - 13323] |

Current indicators

| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 34 | 45 | 0.40 % |



Luxembourg 11-10-2020. Pop: 0.6M. Cumulative incidence: 1495/10⁵

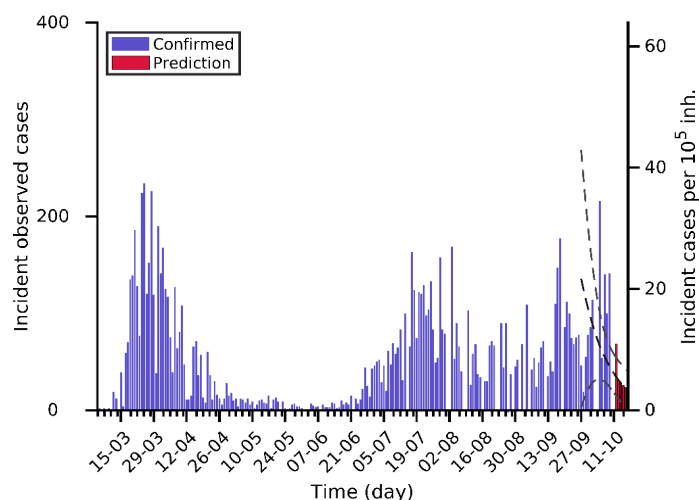


Predictions for next days

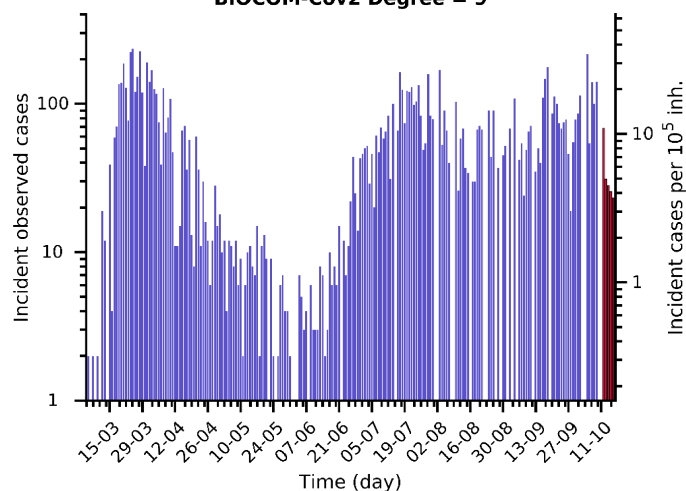
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 9428 (+68) | [9360 - 10142] |
| 14-10-2020 | 9488 (+28) | [9360 - 10214] |
| 16-10-2020 | 9536 (+23) | [9360 - 10282] |

Current indicators

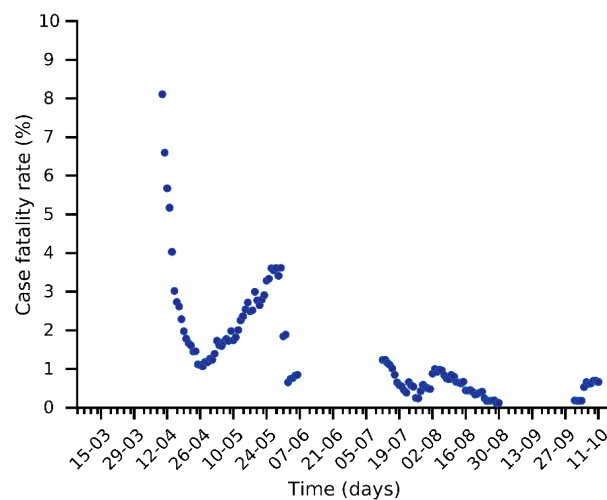
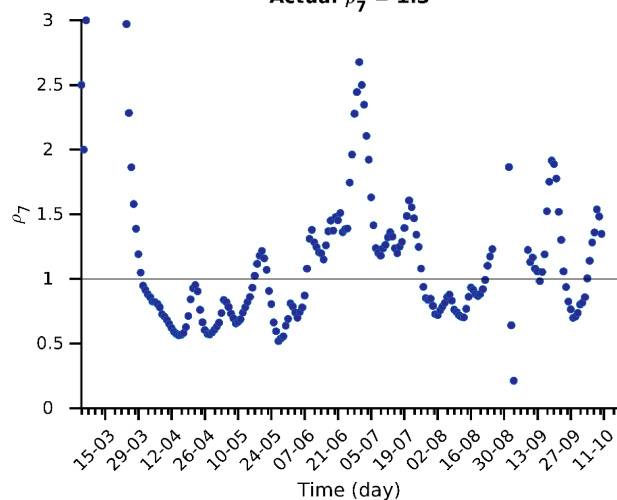
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 160 | 216 | 0.66 % |



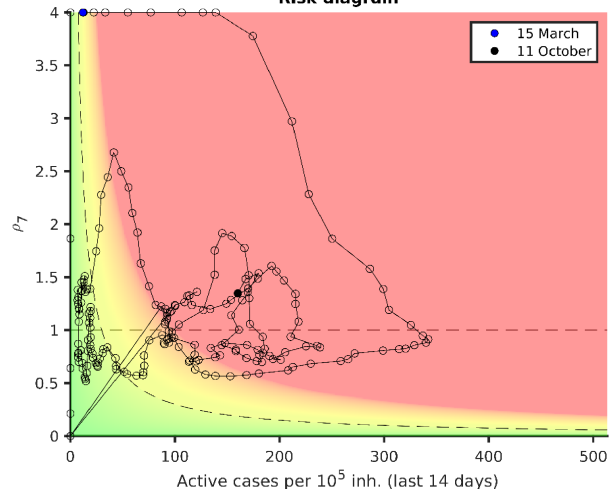
BIOCOM-Cov2 Degree = 9



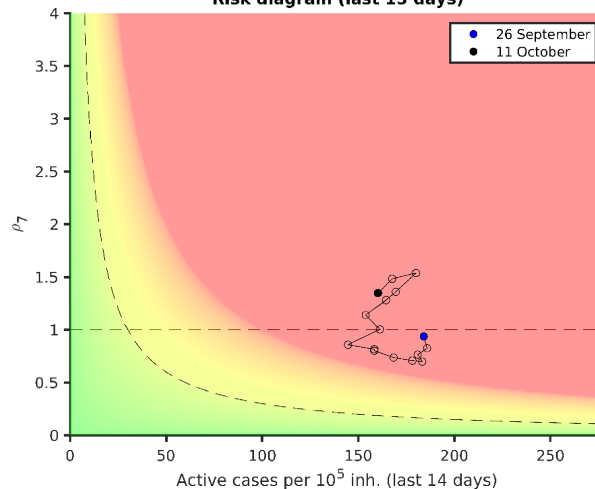
Actual $\rho_7 = 1.3$



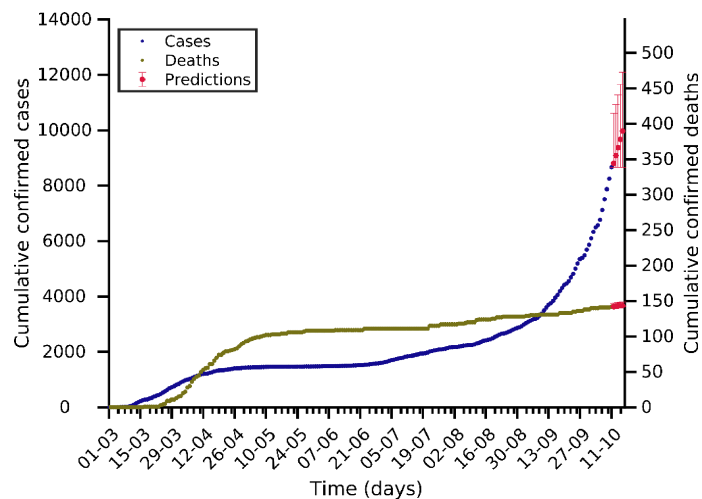
Risk diagram



Risk diagram (last 15 days)



Slovenia 11-10-2020. Pop: 2.1M. Cumulative incidence: 417/10⁵

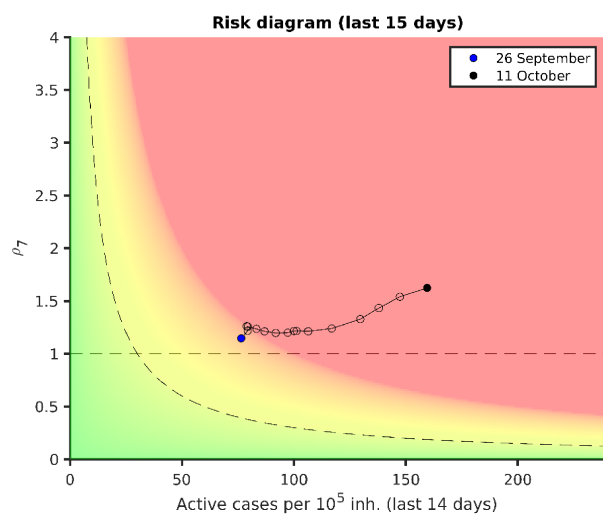
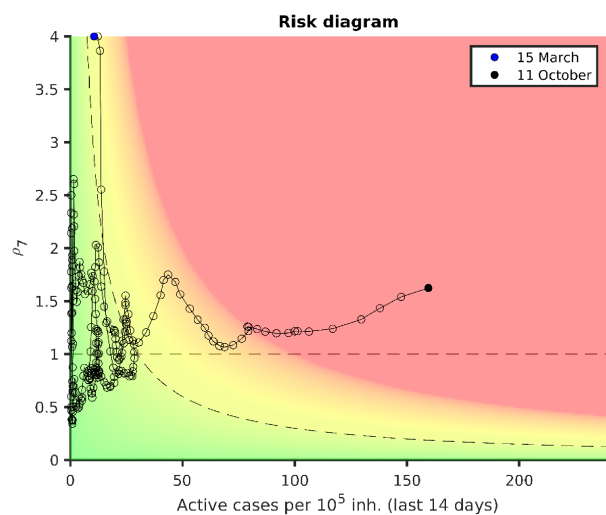
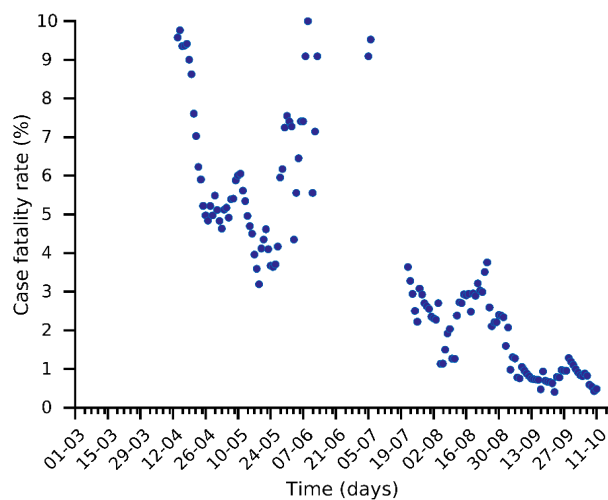
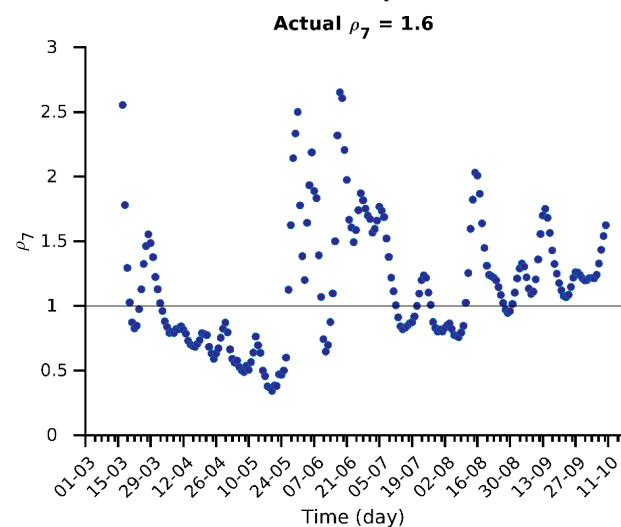
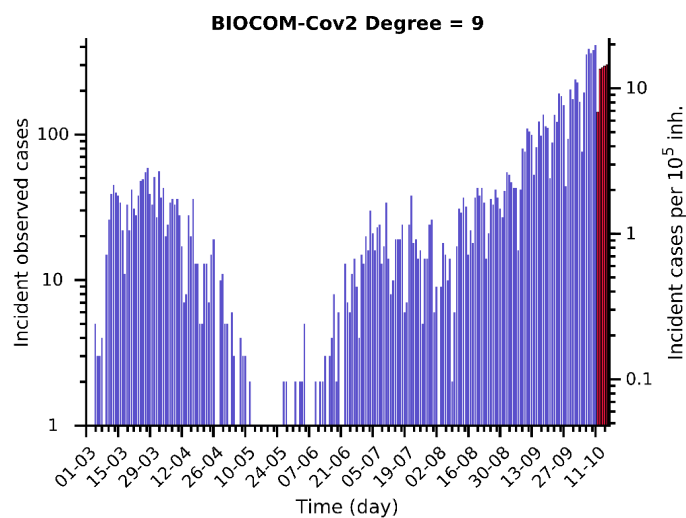
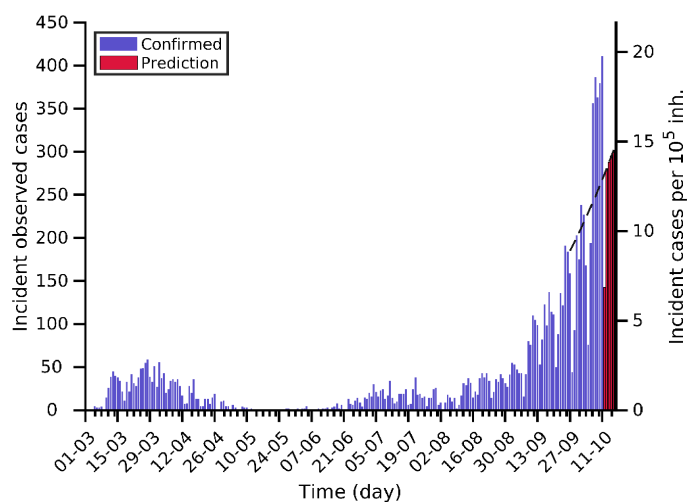


Predictions for next days

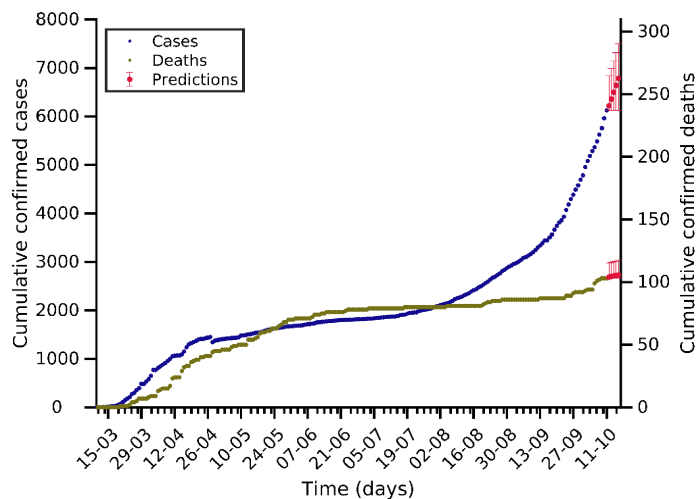
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 8807 (+142) | [8665 - 10612] |
| 14-10-2020 | 9376 (+288) | [8665 - 11274] |
| 16-10-2020 | 9972 (+302) | [8665 - 12094] |

Current indicators

| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 159 | 259 | 0.48 % |



Lithuania 11-10-2020. Pop: 2.7M. Cumulative incidence: 225/10⁵

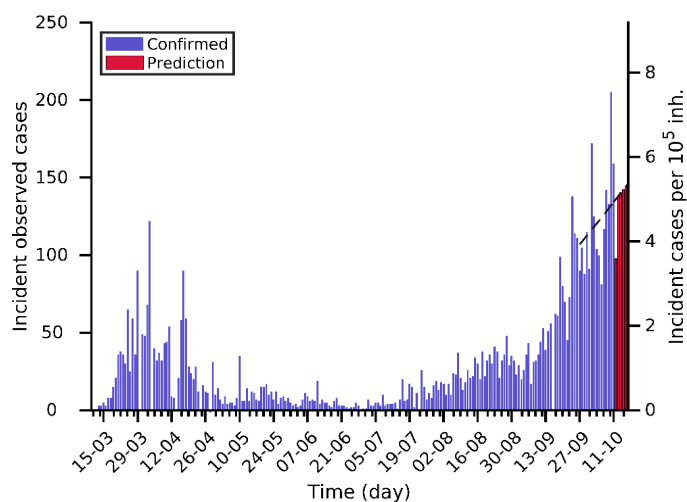


Predictions for next days

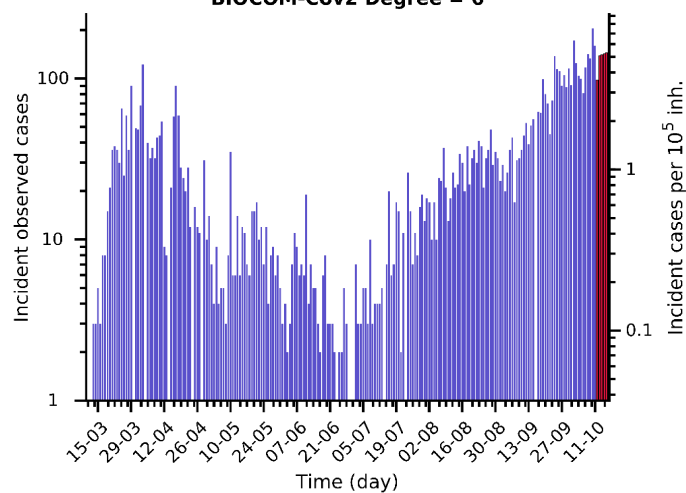
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 6220 (+98) | [6122 - 6839] |
| 14-10-2020 | 6498 (+140) | [6122 - 7146] |
| 16-10-2020 | 6785 (+144) | [6122 - 7499] |

Current indicators

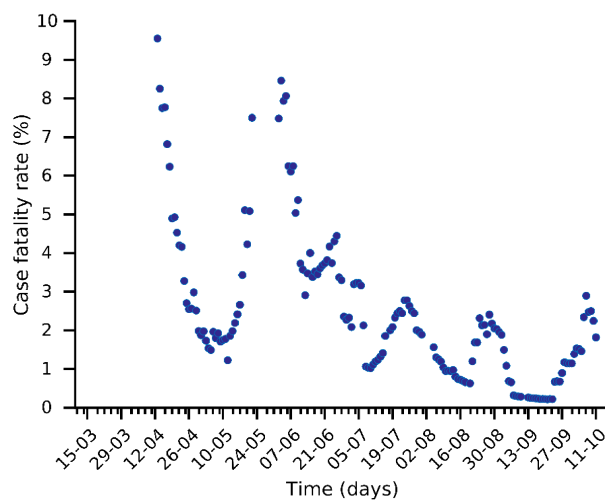
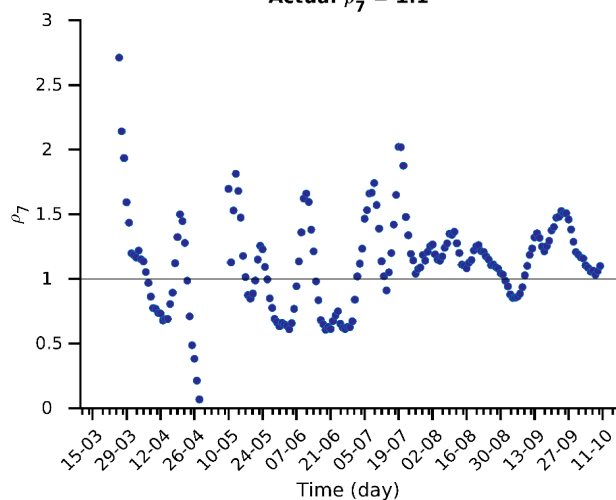
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 64 | 70 | 1.82 % |



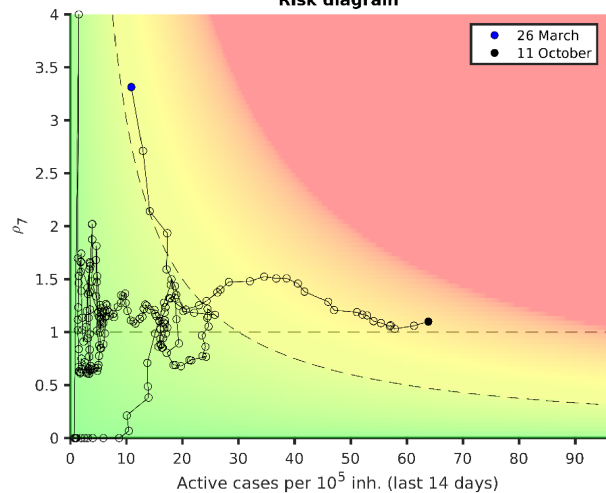
BIOCOM-Cov2 Degree = 6



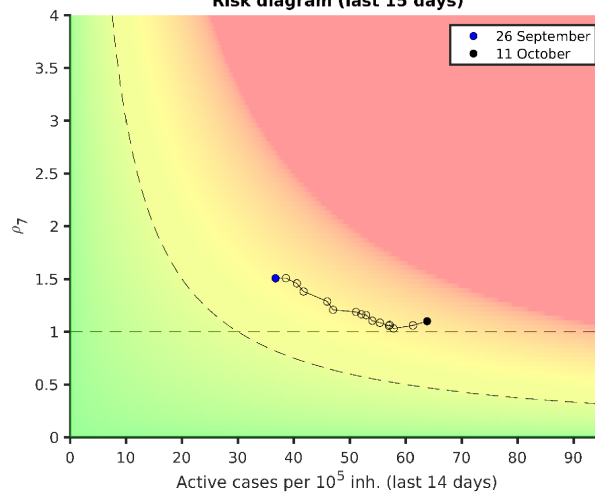
Actual $\rho_7 = 1.1$



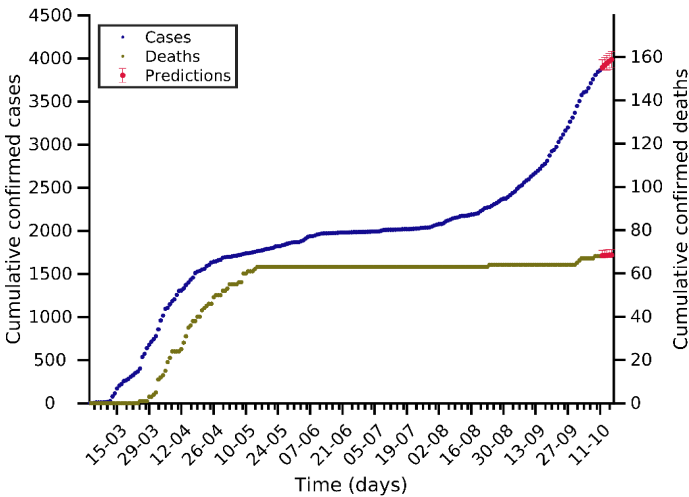
Risk diagram



Risk diagram (last 15 days)

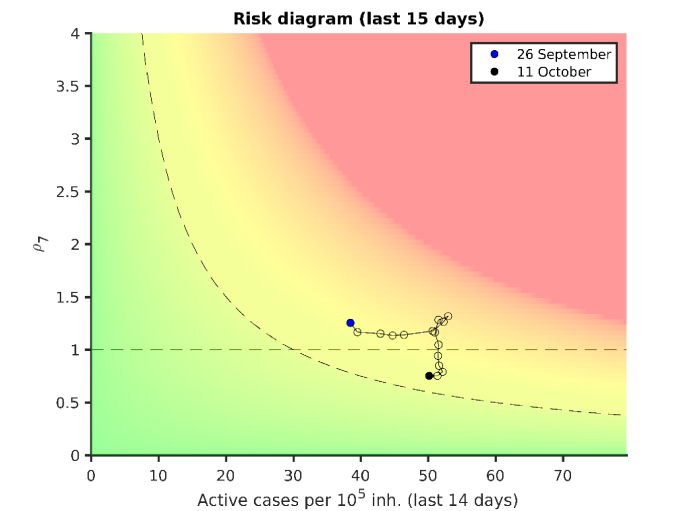
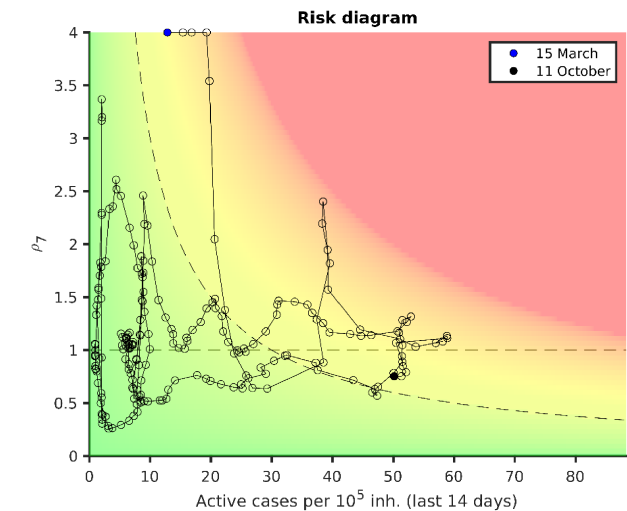
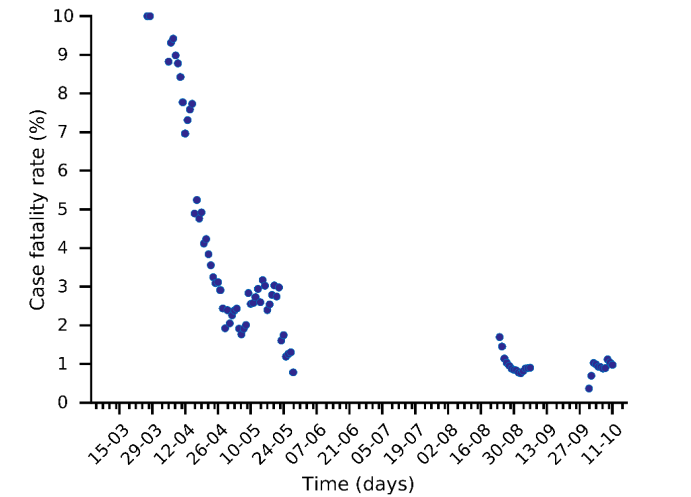
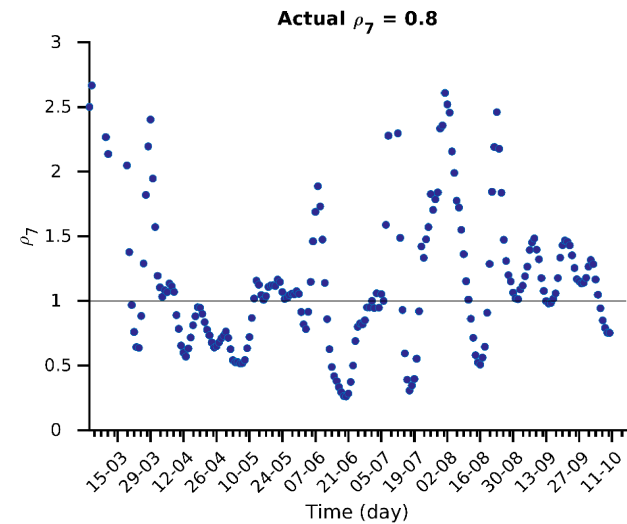
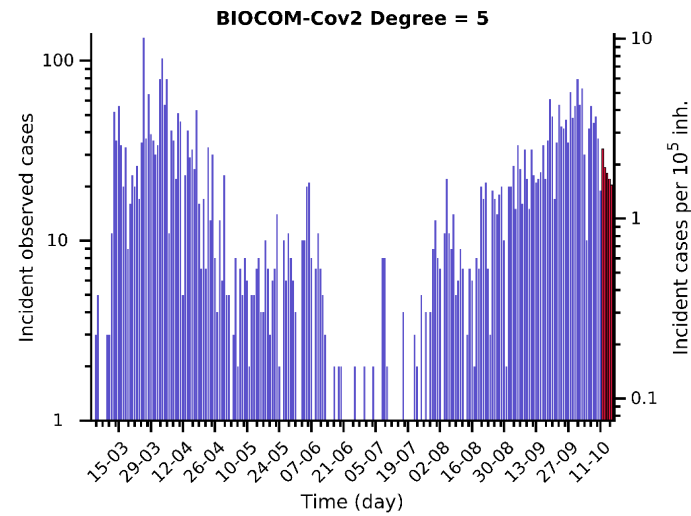
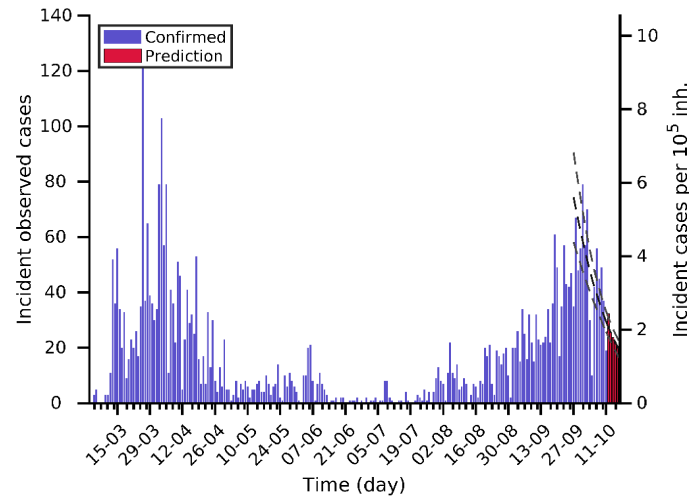


Estonia 11-10-2020. Pop: 1.3M. Cumulative incidence: 291/10⁵

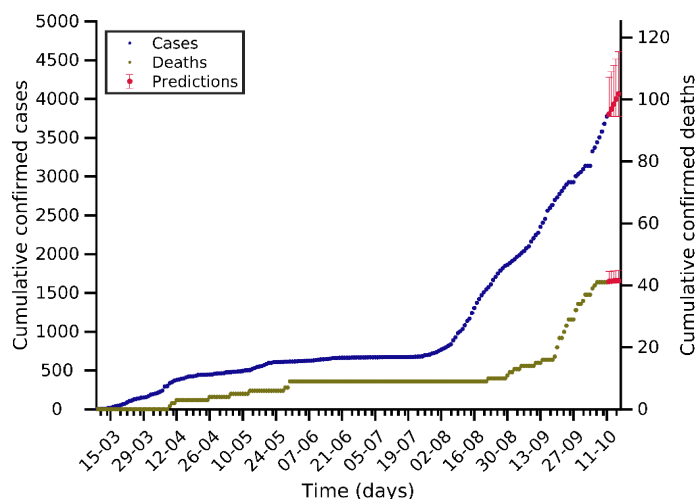


| Predictions for next days | | |
|---------------------------|-----------------|-------------------------|
| Day | Number of cases | 95% Confidence Interval |
| 12-10-2020 | 3897 (+32) | [3865 - 3986] |
| 14-10-2020 | 3946 (+24) | [3865 - 4037] |
| 16-10-2020 | 3989 (+20) | [3895 - 4083] |

| Current indicators | | |
|--------------------|-----|--------|
| A ₁₄ | EPG | CFR |
| 50 | 38 | 0.98 % |



Malta 11-10-2020. Pop: 0.4M. Cumulative incidence: 855/10⁵

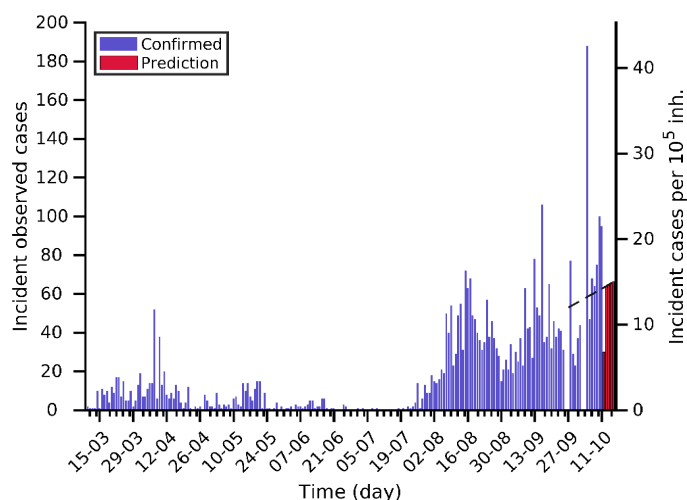


Predictions for next days

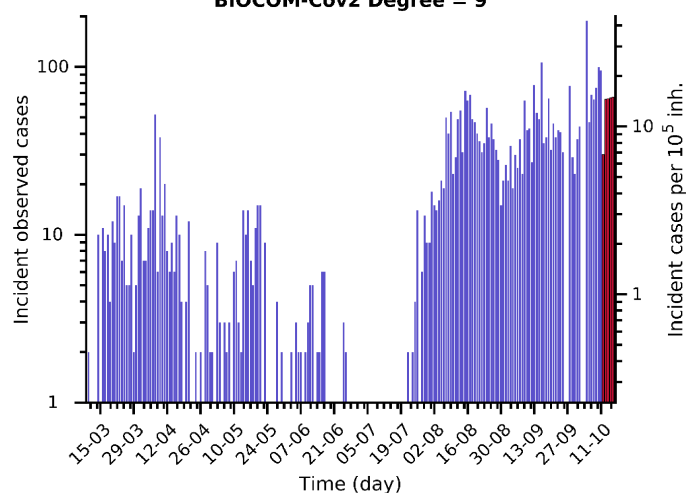
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 3806 (+30) | [3776 - 4282] |
| 14-10-2020 | 3935 (+65) | [3776 - 4432] |
| 16-10-2020 | 4067 (+66) | [3776 - 4611] |

Current indicators

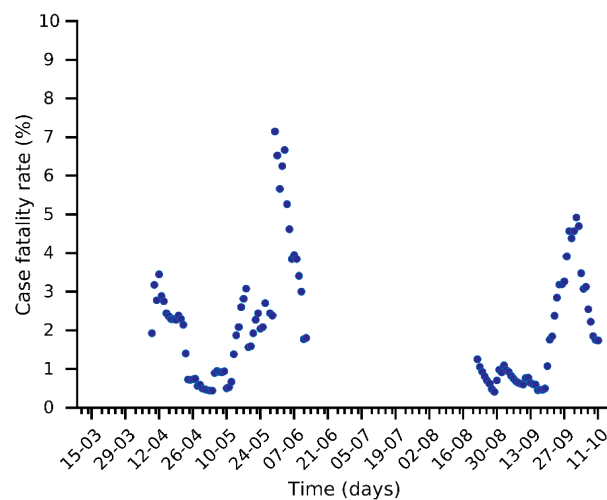
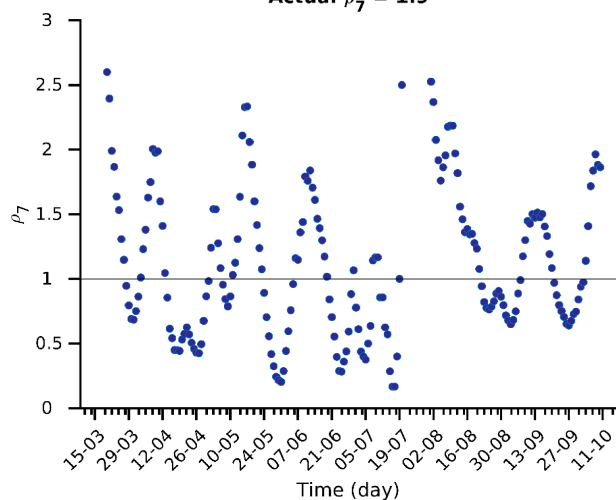
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 192 | 357 | 1.74 % |



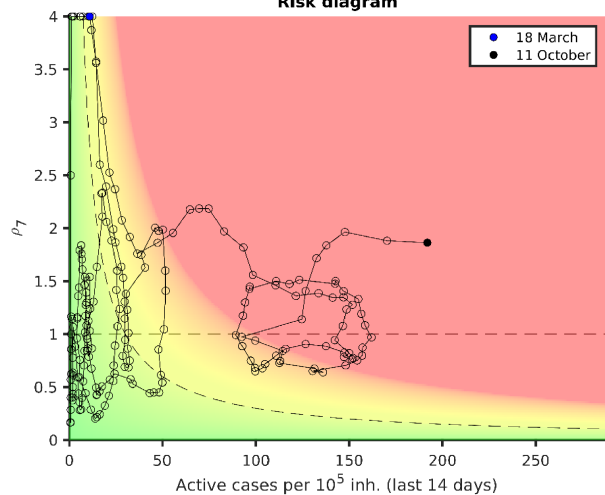
BIOCOM-Cov2 Degree = 9



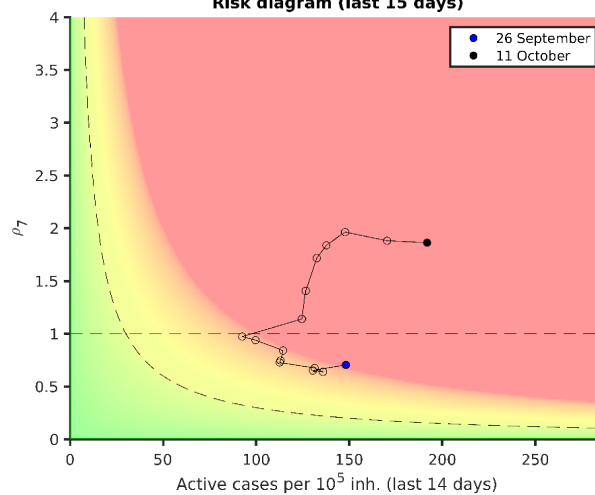
Actual $\rho_7 = 1.9$



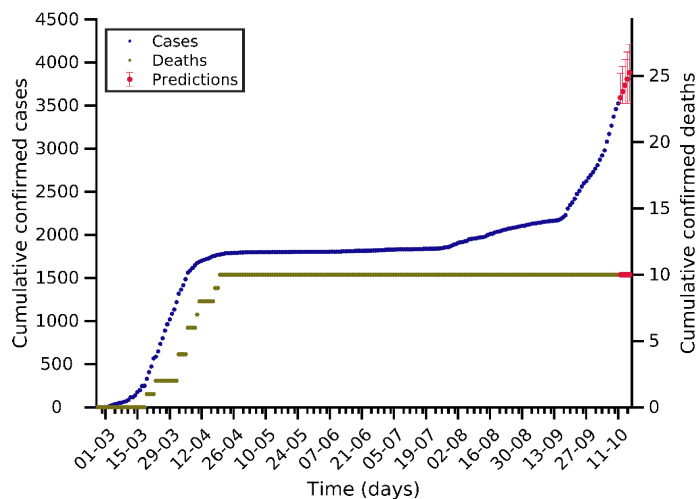
Risk diagram



Risk diagram (last 15 days)



Iceland 11-10-2020. Pop: 0.3M. Cumulative incidence: 1033/10⁵

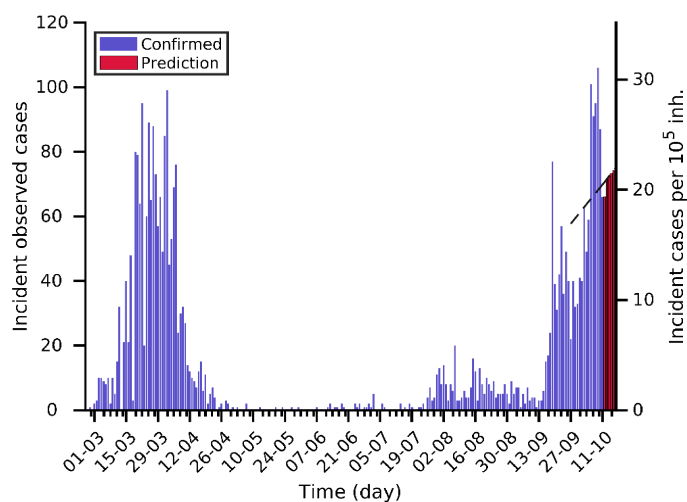


Predictions for next days

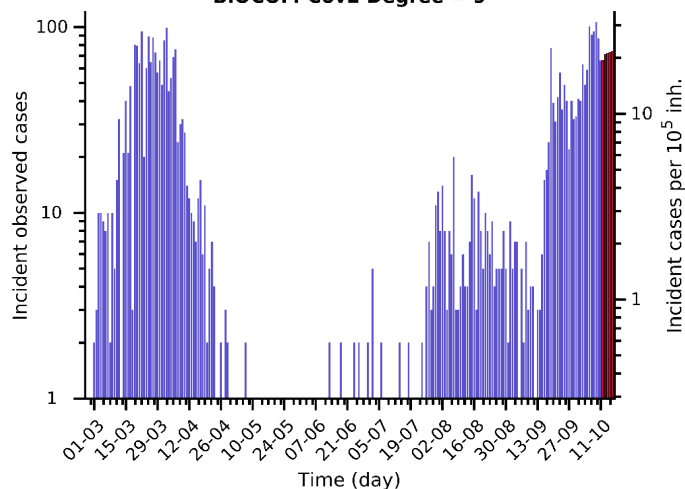
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 3592 (+66) | [3526 - 3879] |
| 14-10-2020 | 3736 (+72) | [3526 - 4036] |
| 16-10-2020 | 3884 (+74) | [3554 - 4213] |

Current indicators

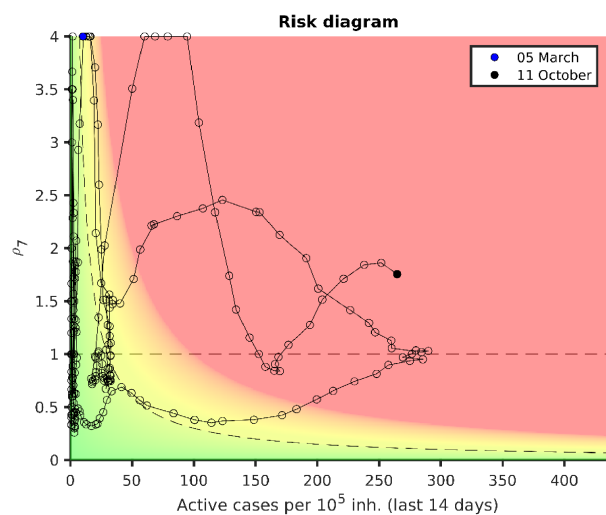
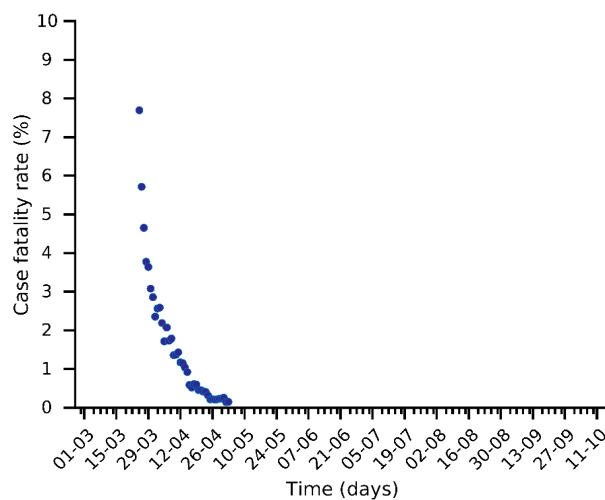
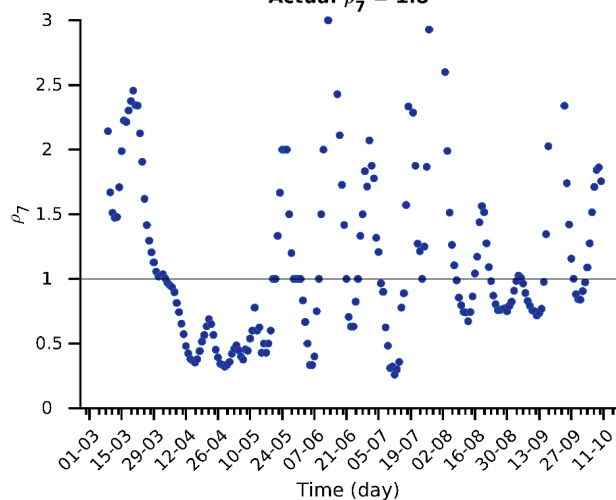
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 265 | 464 | 0.00 % |



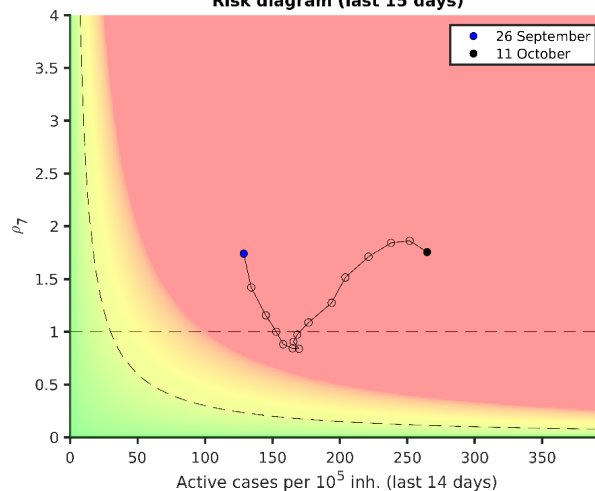
BIOCOM-Cov2 Degree = 9



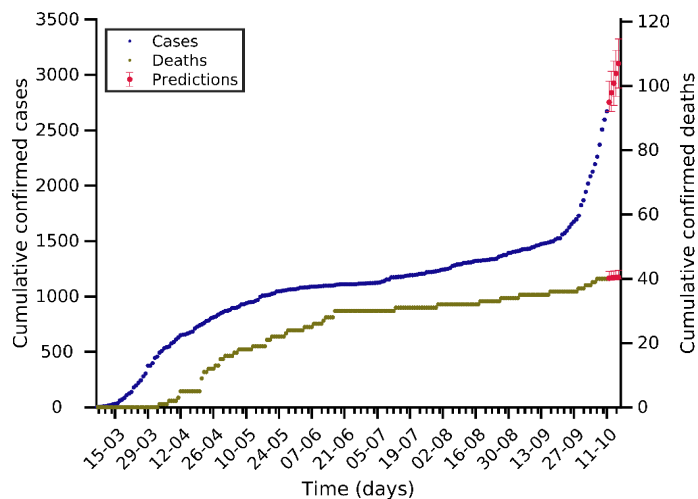
Actual $\rho_7 = 1.8$



Risk diagram (last 15 days)



Latvia 11-10-2020. Pop: 1.9M. Cumulative incidence: 142/10⁵

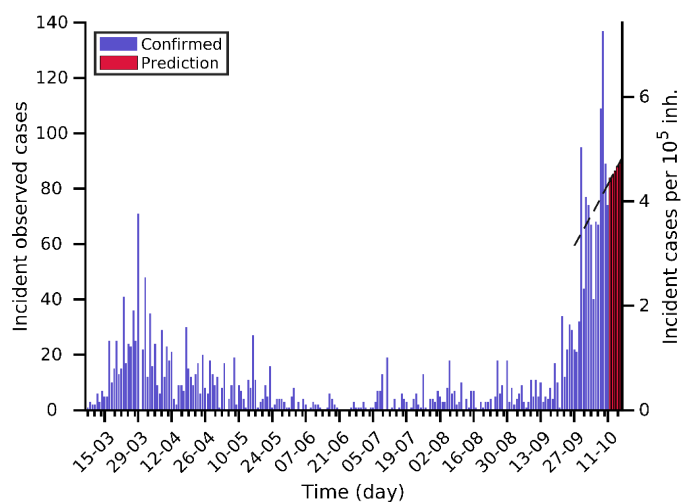


Predictions for next days

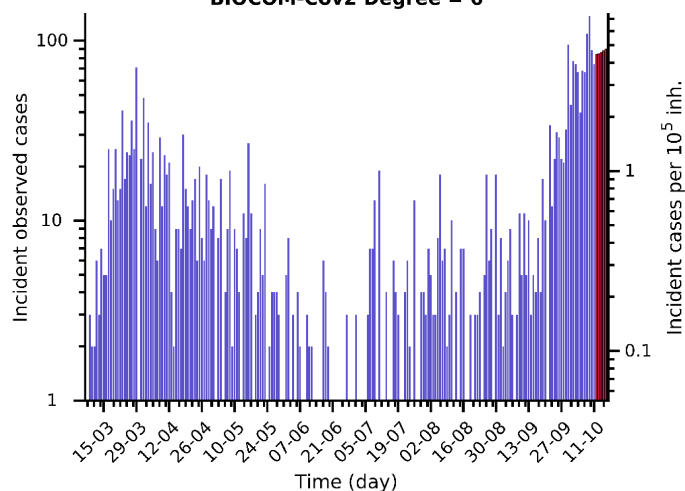
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 2754 (+84) | [2670 - 2944] |
| 14-10-2020 | 2925 (+86) | [2726 - 3124] |
| 16-10-2020 | 3103 (+90) | [2881 - 3324] |

Current indicators

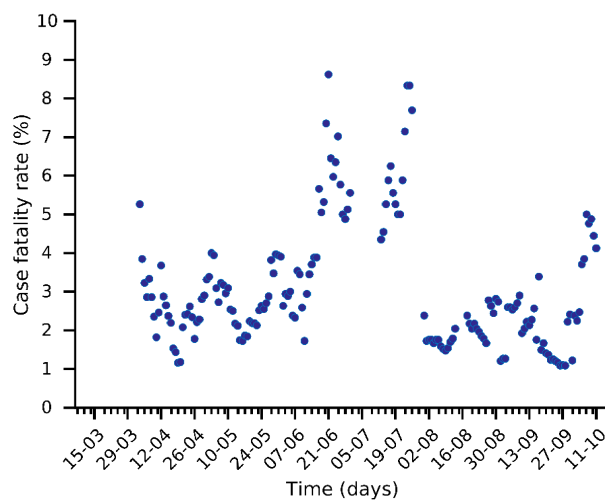
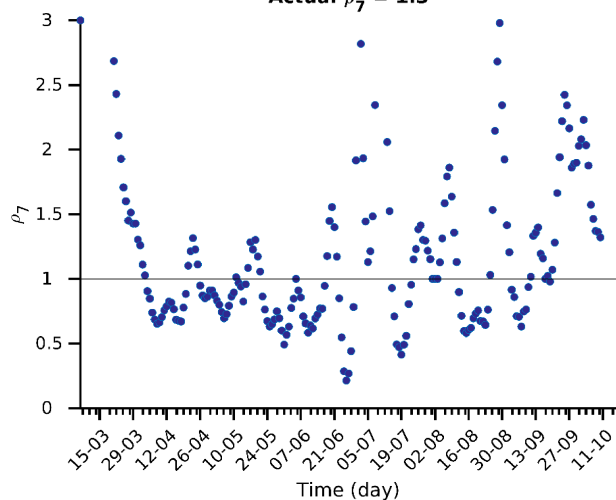
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 53 | 70 | 4.12 % |



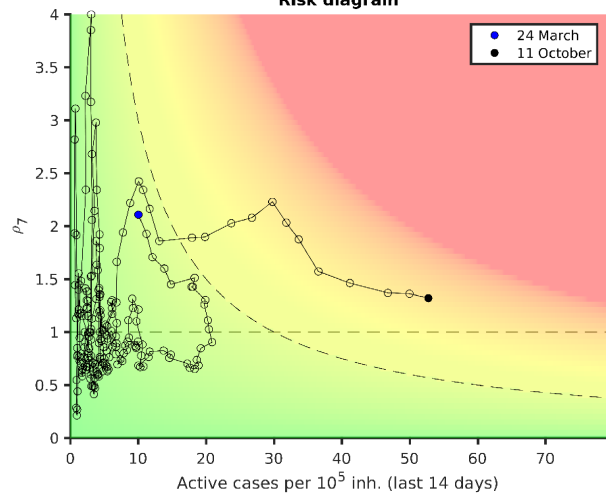
BIOCOM-Cov2 Degree = 6



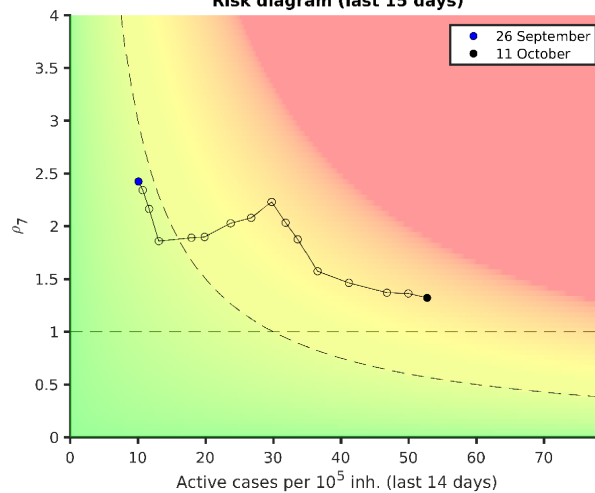
Actual $\rho_7 = 1.3$



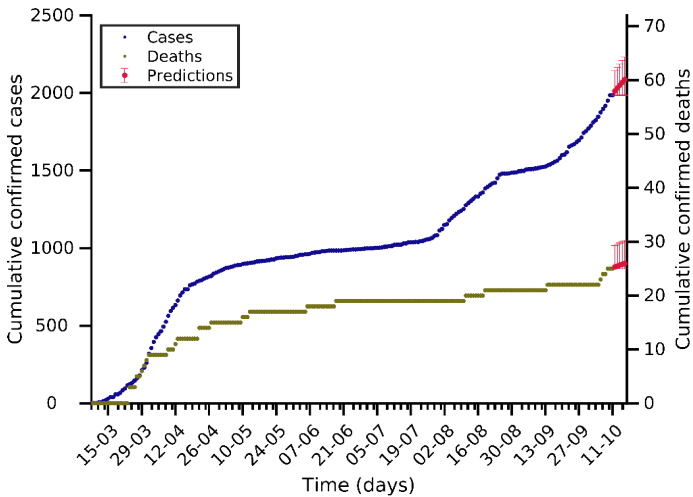
Risk diagram



Risk diagram (last 15 days)

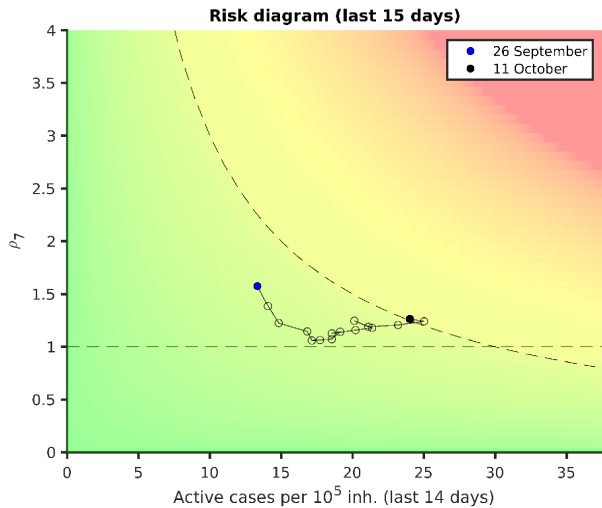
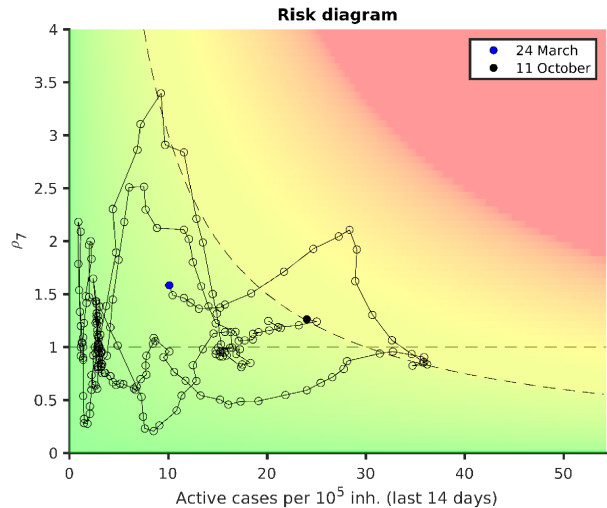
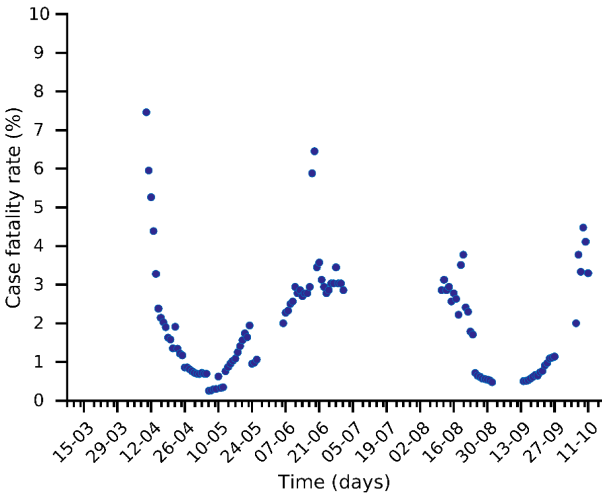
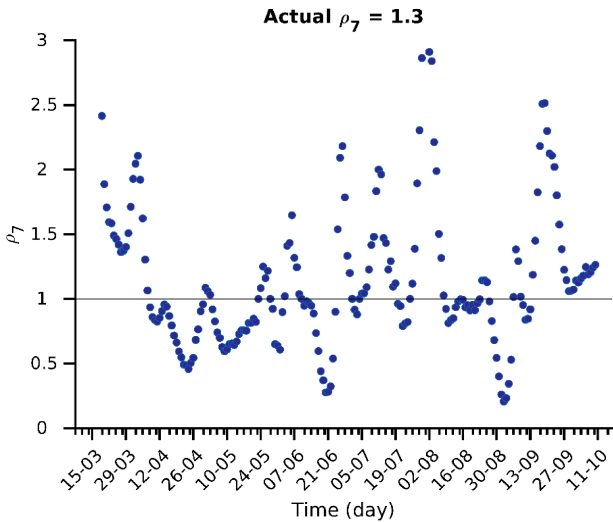
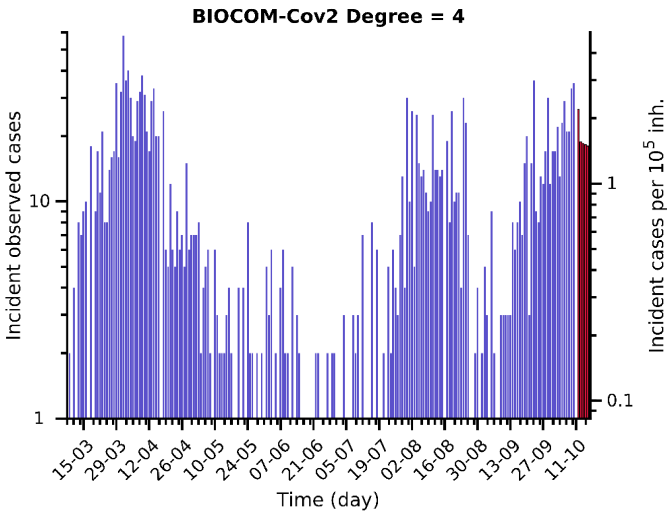
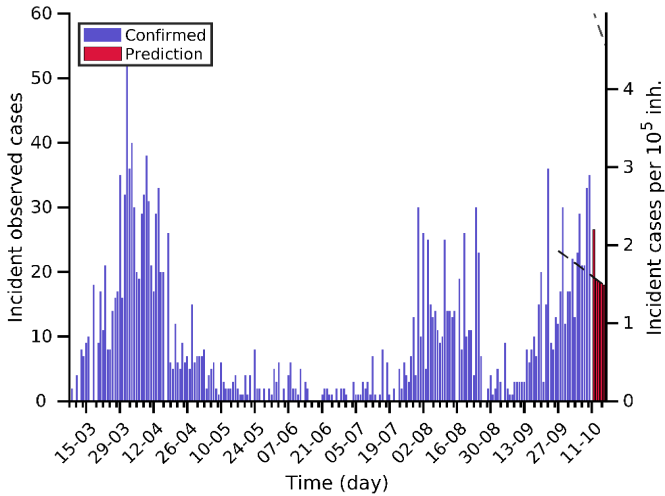


Cyprus 11-10-2020. Pop: 1.2M. Cumulative incidence: 164/10⁵



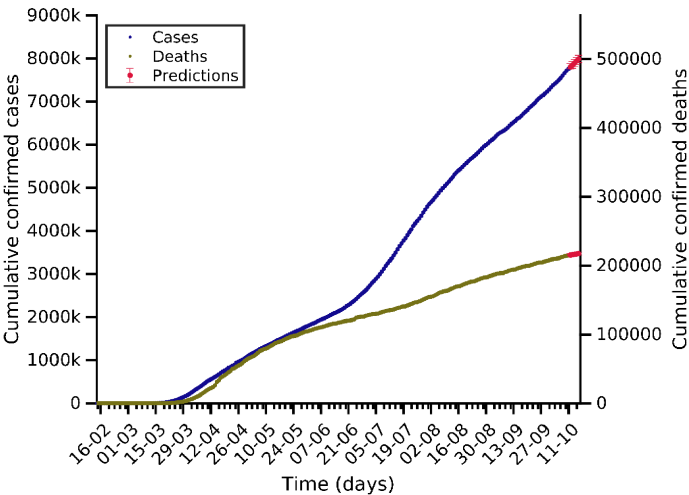
| Predictions for next days | | |
|---------------------------|-----------------|-------------------------|
| Day | Number of cases | 95% Confidence Interval |
| 12-10-2020 | 2013 (+27) | [1986 - 2144] |
| 14-10-2020 | 2050 (+19) | [1986 - 2186] |
| 16-10-2020 | 2086 (+18) | [1986 - 2232] |

| Current indicators | | |
|--------------------|-----|--------|
| A ₁₄ | EPG | CFR |
| 24 | 30 | 3.30 % |



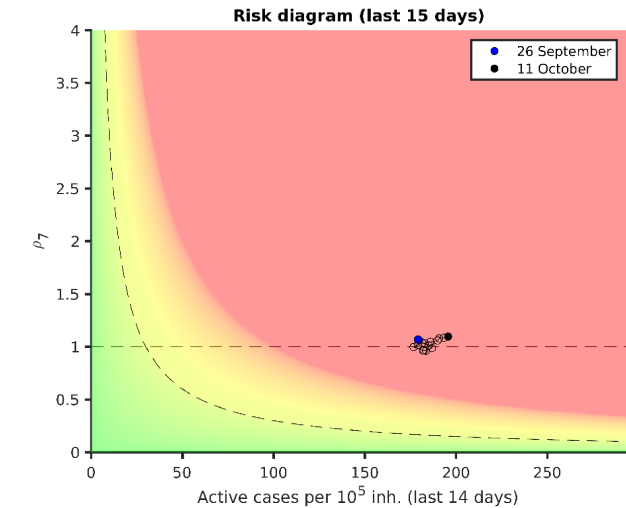
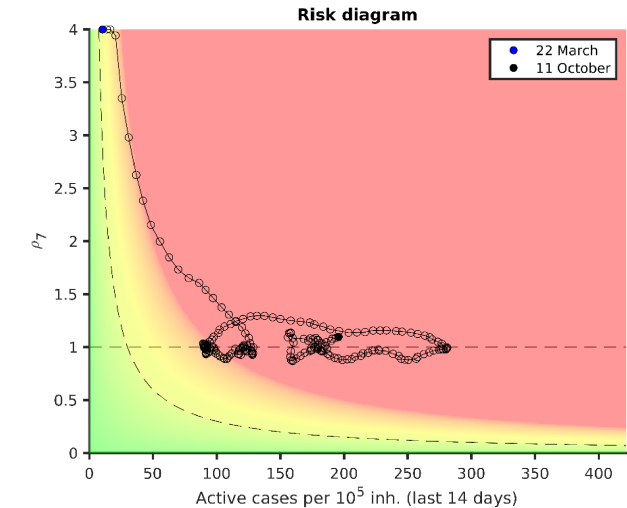
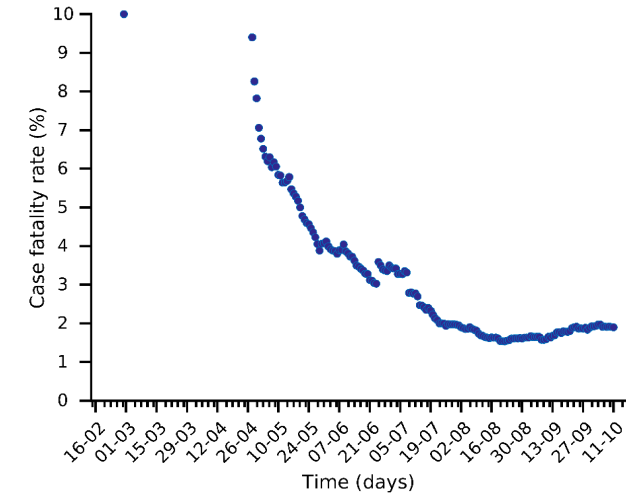
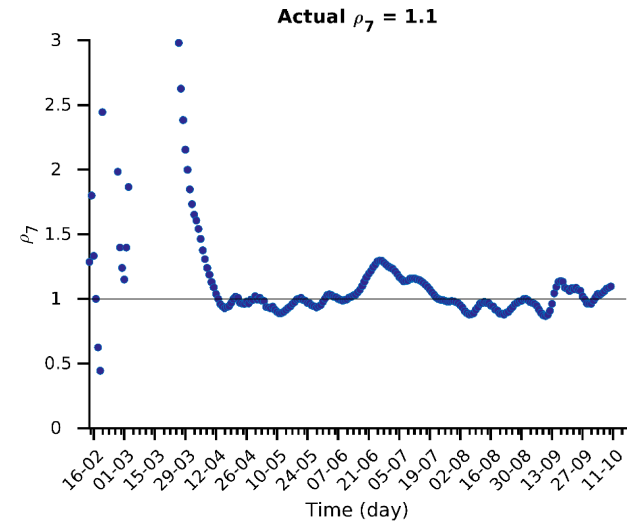
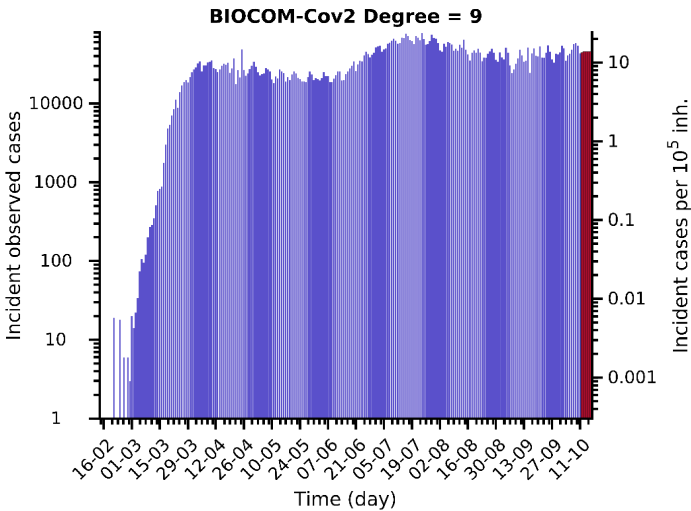
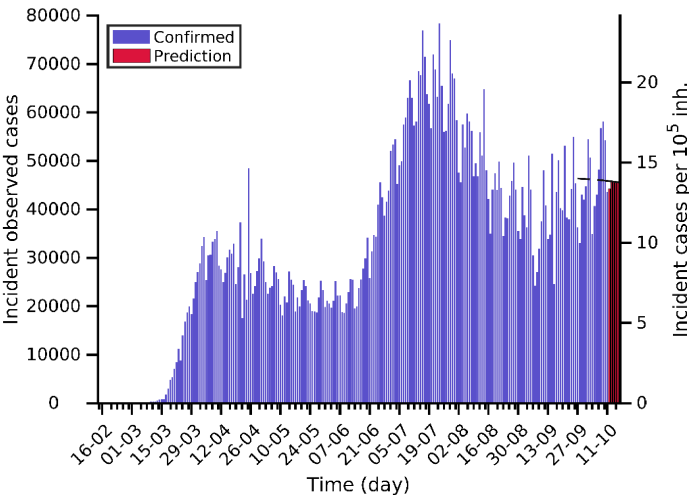
(2) Analysis and prediction of COVID-19 for other countries

USA 11-10-2020. Pop: 331.0M. Cumulative incidence: 2345/10⁵

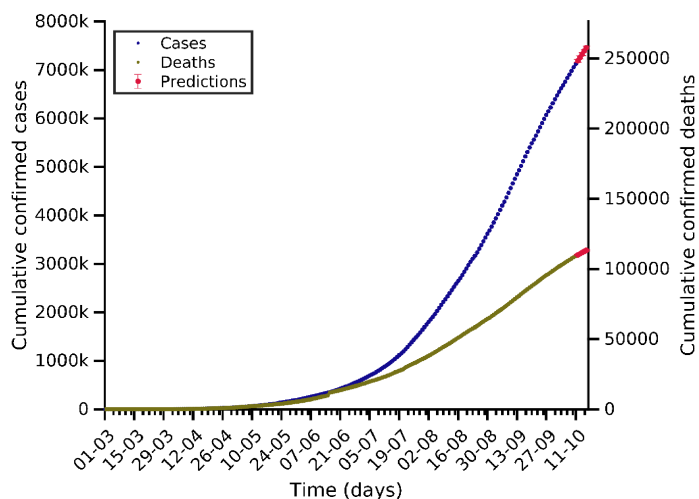


| Predictions for next days | | |
|---------------------------|------------------|-------------------------|
| Day | Number of cases | 95% Confidence Interval |
| 12-10-2020 | 7806825 (+44281) | [7762544 - 7884672] |
| 14-10-2020 | 7898329 (+45726) | [7817438 - 7979220] |
| 16-10-2020 | 7989613 (+45614) | [7902227 - 8077000] |

| Current indicators | | |
|--------------------|-----|--------|
| A ₁₄ | EPG | CFR |
| 196 | 215 | 1.90 % |



India 11-10-2020. Pop: 1353.0M. Cumulative incidence: 526/10⁵

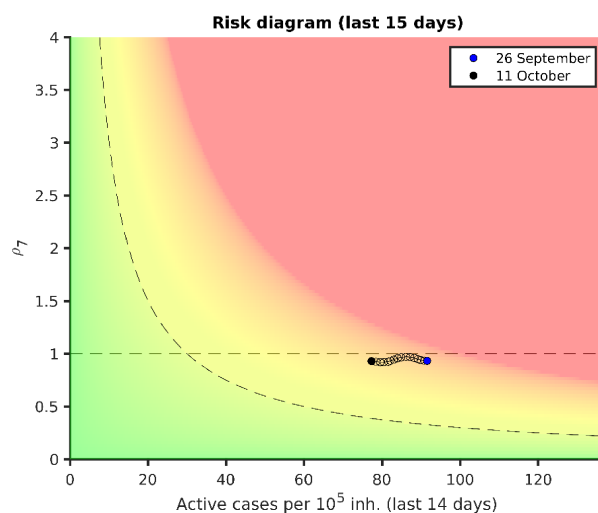
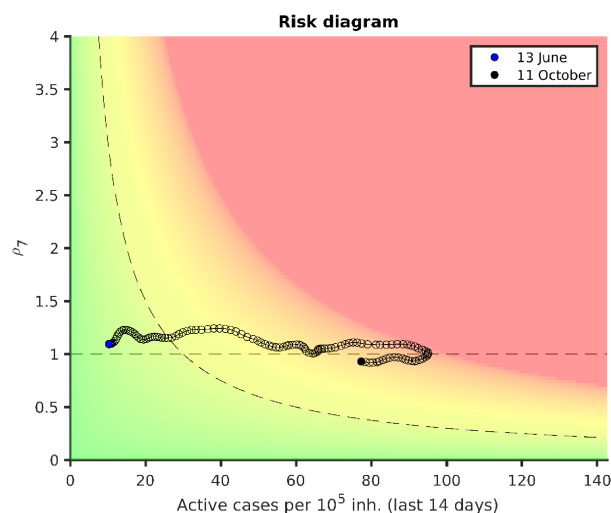
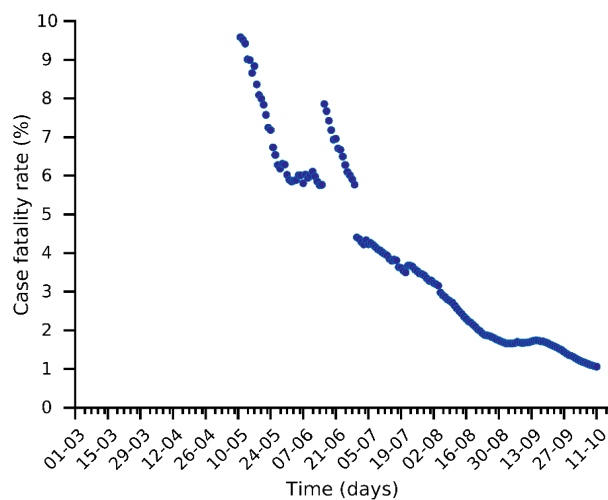
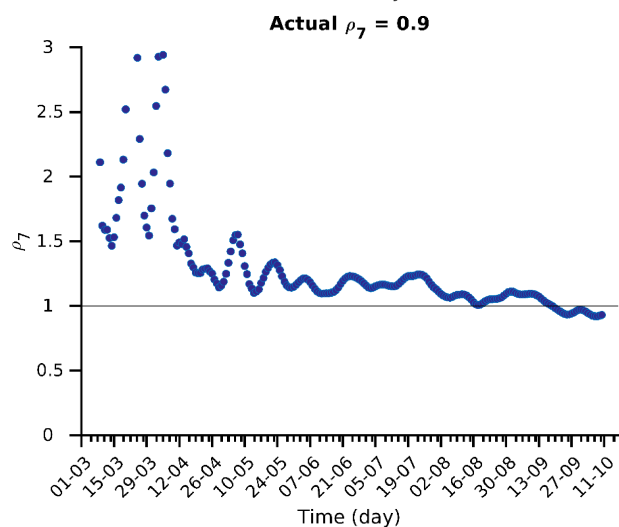
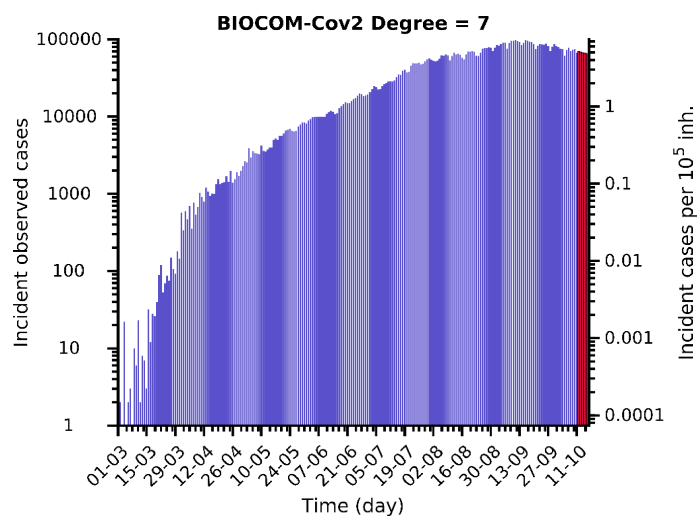
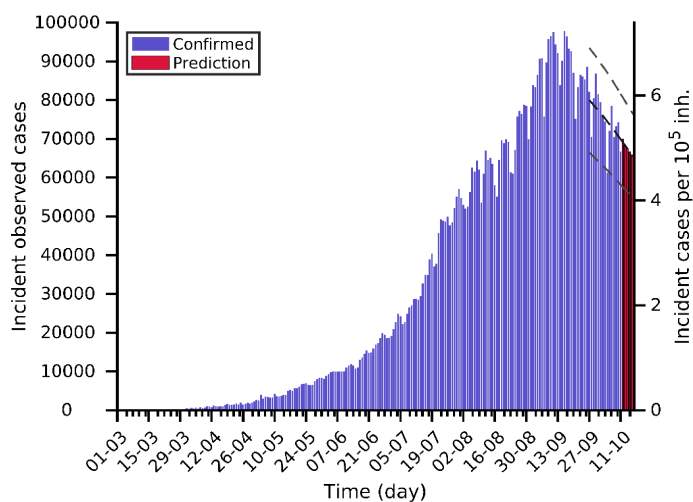


Predictions for next days

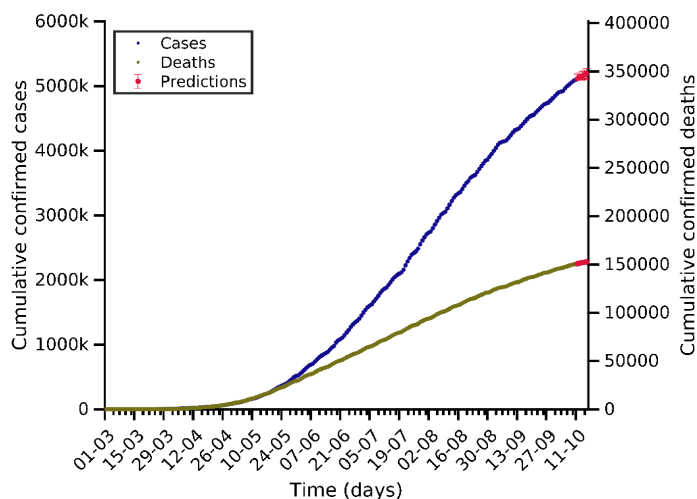
| Day | Number of cases | 95% Confidence Interval |
|------------|------------------|-------------------------|
| 12-10-2020 | 7190534 (+69996) | [7160442 - 7220626] |
| 14-10-2020 | 7326361 (+67514) | [7295163 - 7357560] |
| 16-10-2020 | 7458980 (+65907) | [7425486 - 7492475] |

Current indicators

| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 77 | 72 | 1.06 % |



Brazil 11-10-2020. Pop: 212.6M. Cumulative incidence: 2397/10⁵

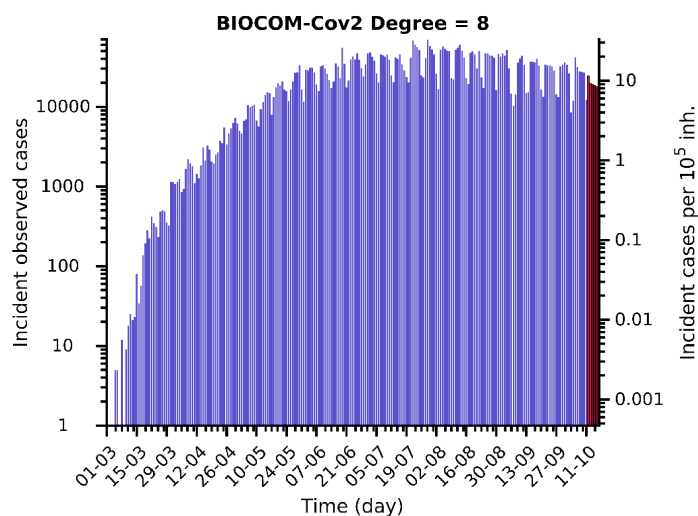
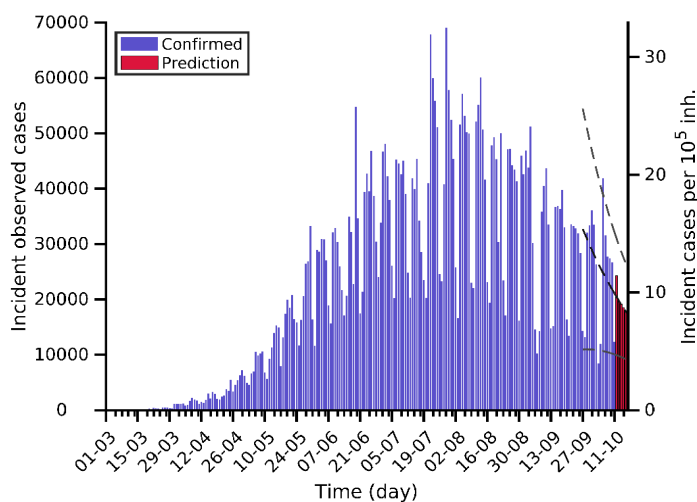


Predictions for next days

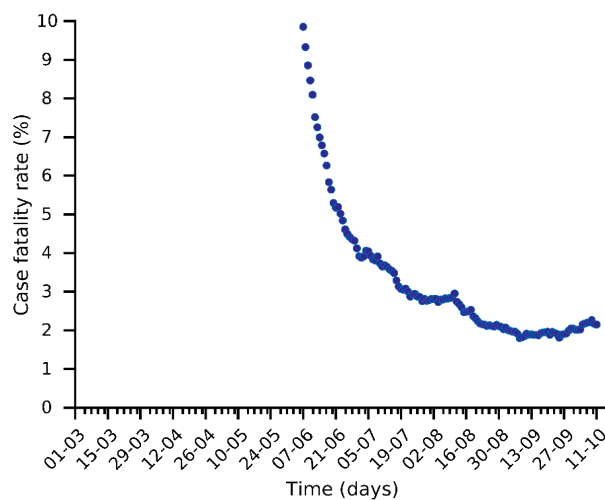
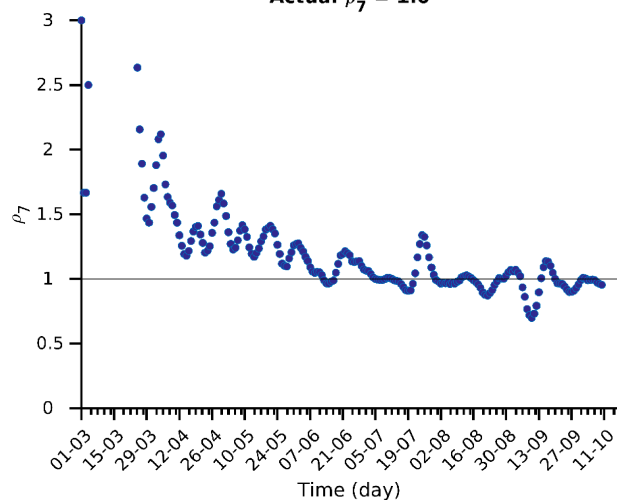
| Day | Number of cases | 95% Confidence Interval |
|------------|------------------|-------------------------|
| 12-10-2020 | 5119306 (+24324) | [5094982 - 5188758] |
| 14-10-2020 | 5158219 (+19136) | [5094982 - 5229780] |
| 16-10-2020 | 5194638 (+17907) | [5119012 - 5270264] |

Current indicators

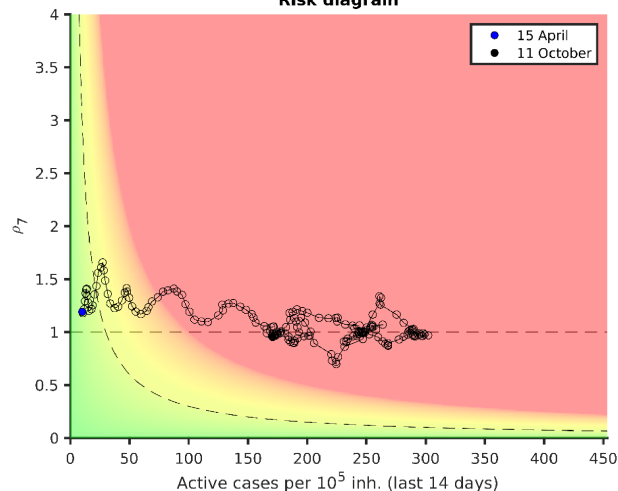
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 171 | 163 | 2.15 % |



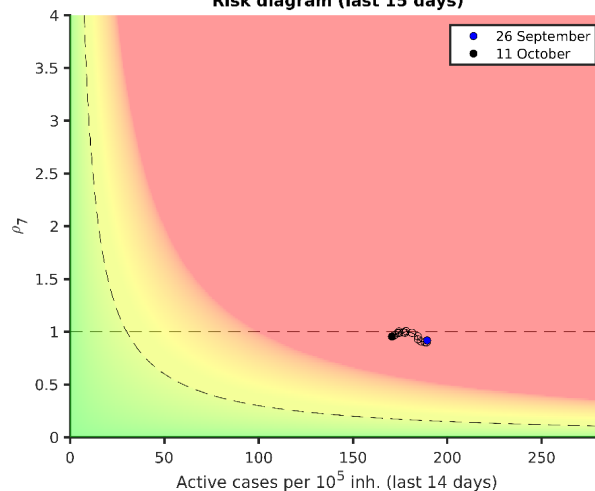
Actual $\rho_7 = 1.0$



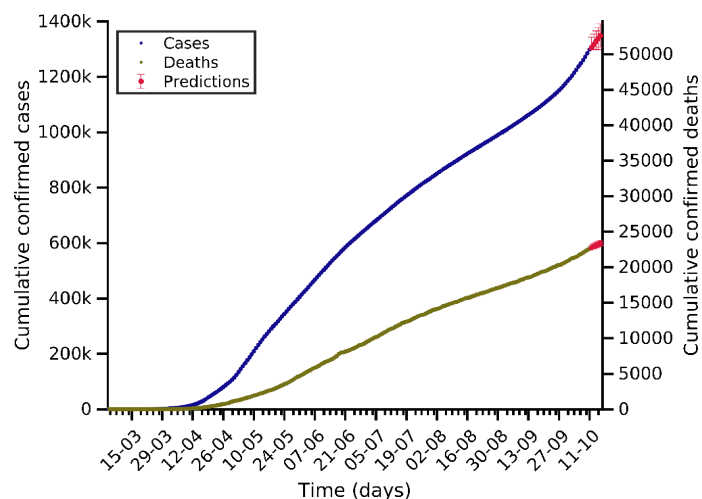
Risk diagram



Risk diagram (last 15 days)



Russia 11-10-2020. Pop: 145.9M. Cumulative incidence: 890/10⁵

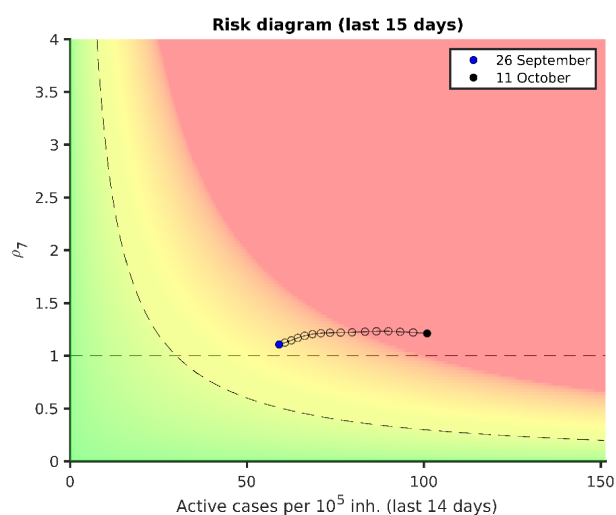
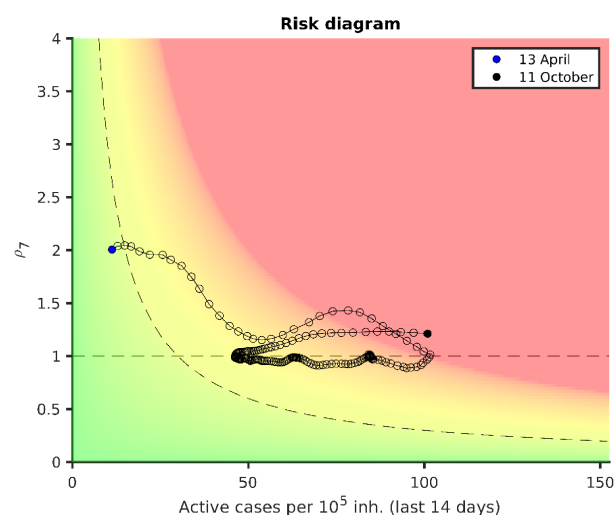
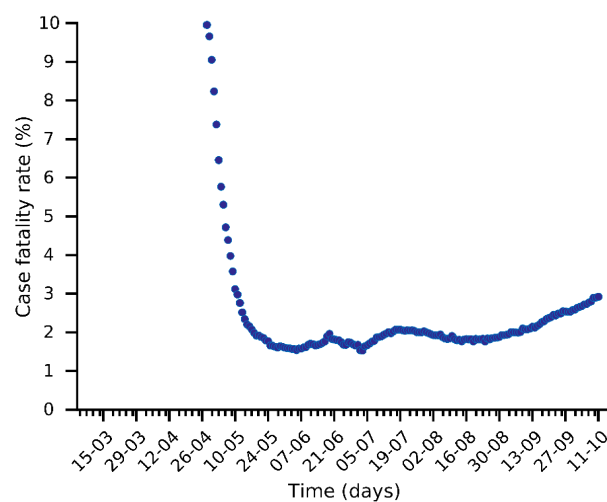
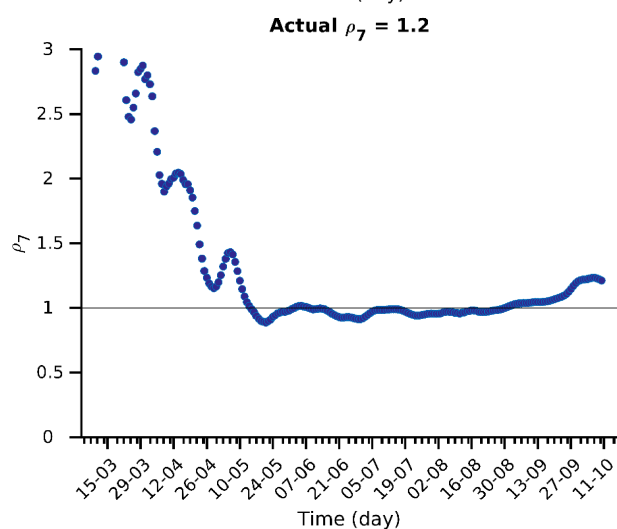
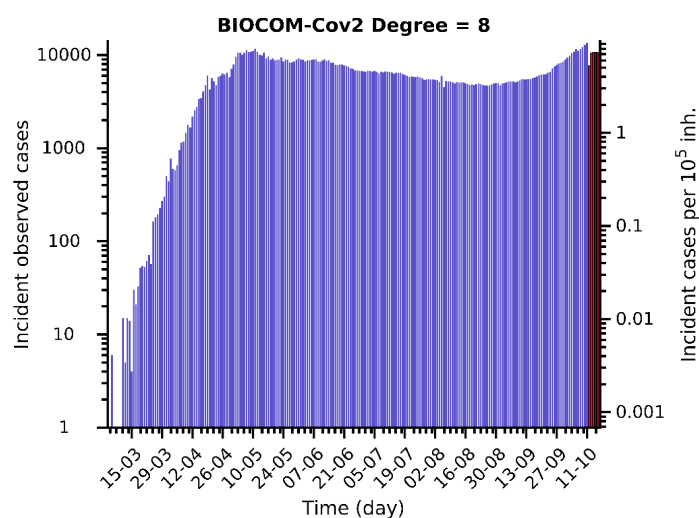
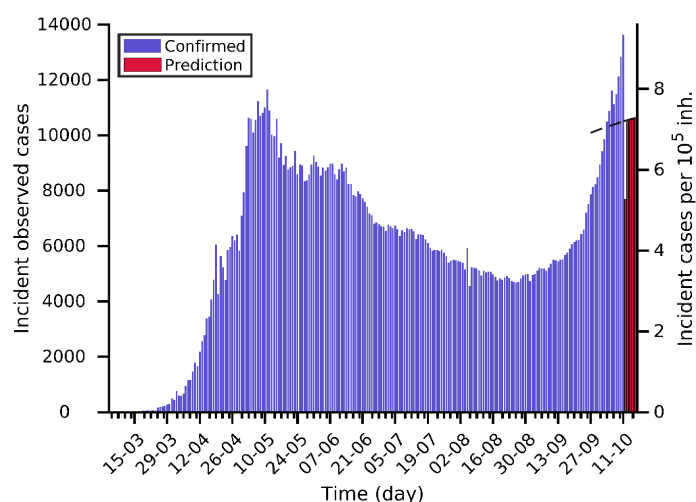


Predictions for next days

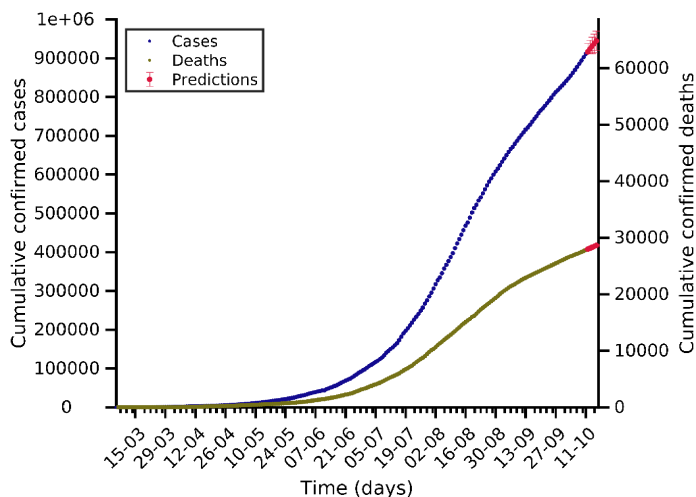
| Day | Number of cases | 95% Confidence Interval |
|------------|------------------|-------------------------|
| 12-10-2020 | 1306401 (+7683) | [1298718 - 1343757] |
| 14-10-2020 | 1327531 (+10577) | [1298718 - 1366400] |
| 16-10-2020 | 1348760 (+10627) | [1306616 - 1390904] |

Current indicators

| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 101 | 122 | 2.92 % |



Colombia 11-10-2020. Pop: 50.9M. Cumulative incidence: 1791/10⁵

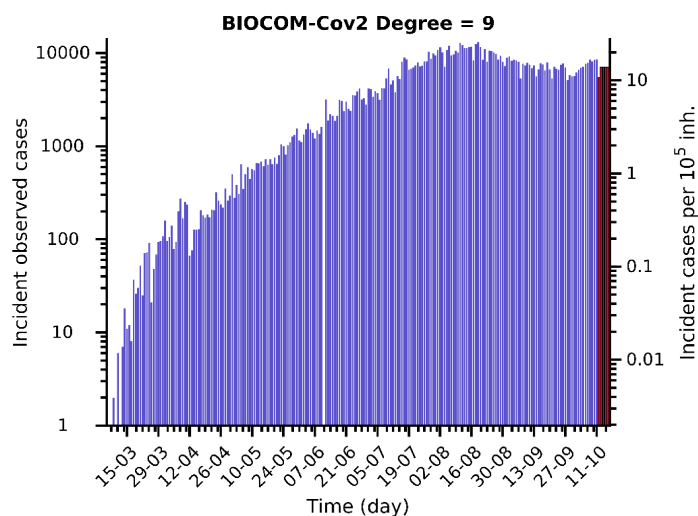
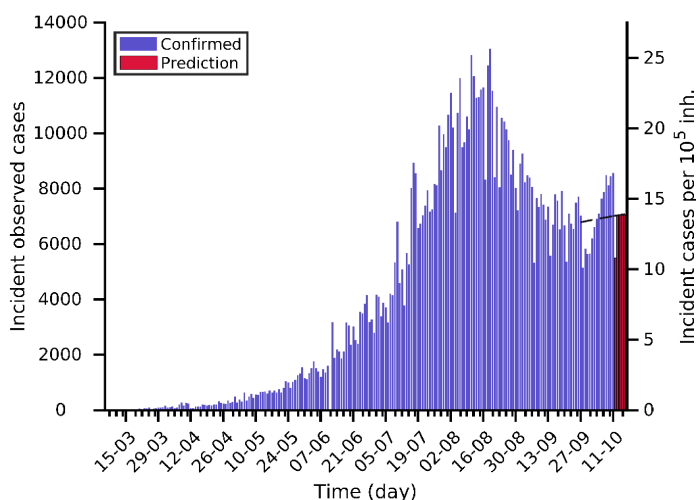


Predictions for next days

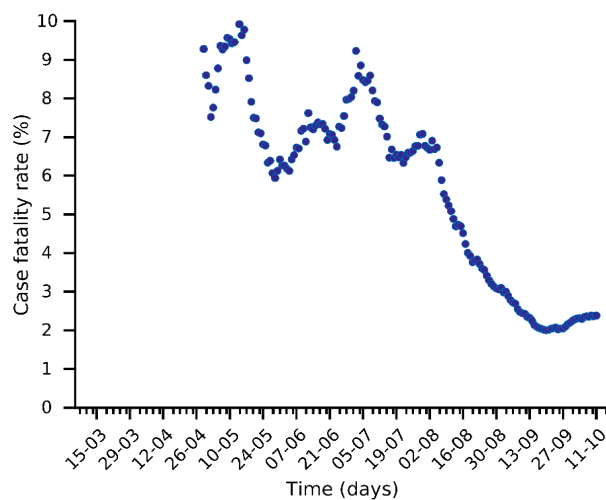
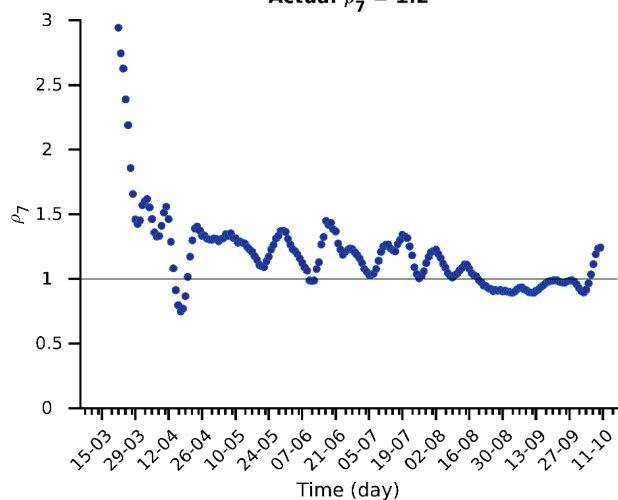
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 916814 (+5498) | [911316 - 939029] |
| 14-10-2020 | 930901 (+7051) | [911316 - 954012] |
| 16-10-2020 | 945042 (+7077) | [919997 - 970086] |

Current indicators

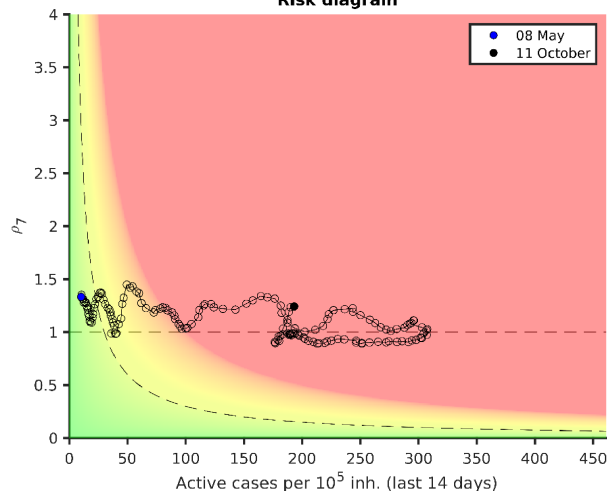
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 193 | 240 | 2.38 % |



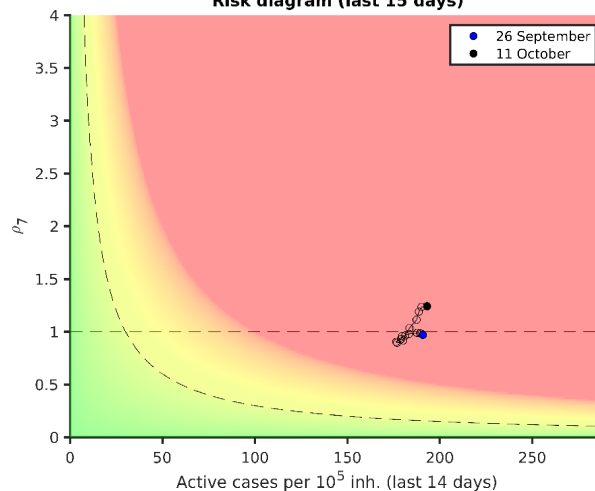
Actual $\rho_7 = 1.2$



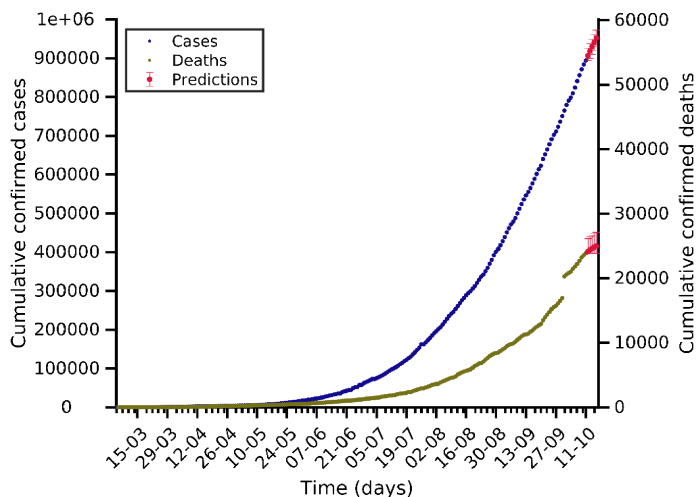
Risk diagram



Risk diagram (last 15 days)



Argentina 11-10-2020. Pop: 45.2M. Cumulative incidence: 1978/10⁵

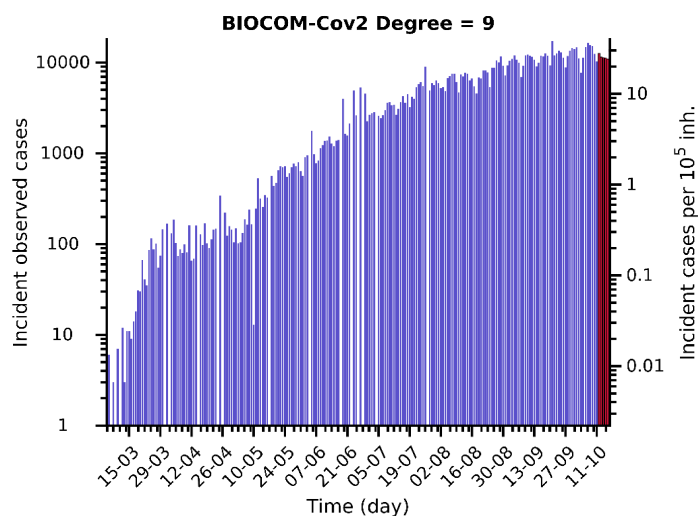
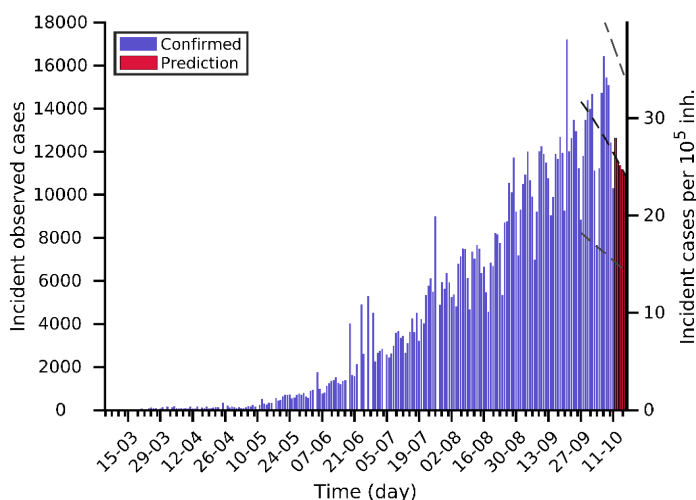


Predictions for next days

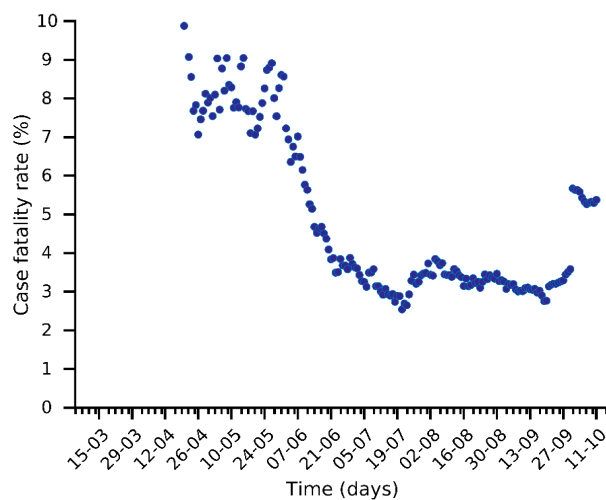
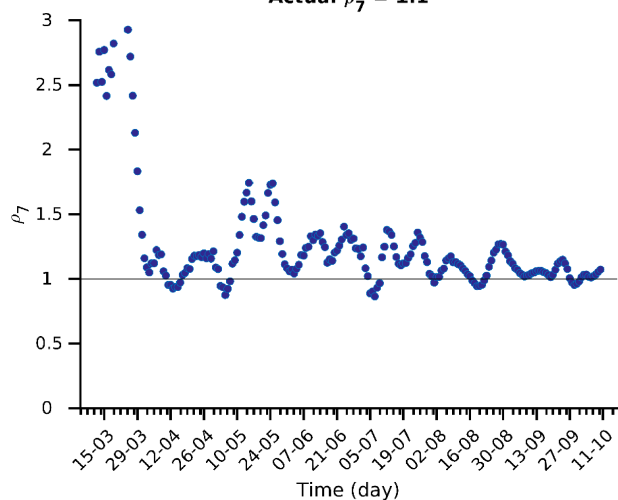
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 906835 (+12642) | [894193 - 925844] |
| 14-10-2020 | 929777 (+11373) | [910084 - 949469] |
| 16-10-2020 | 951932 (+10979) | [930838 - 973026] |

Current indicators

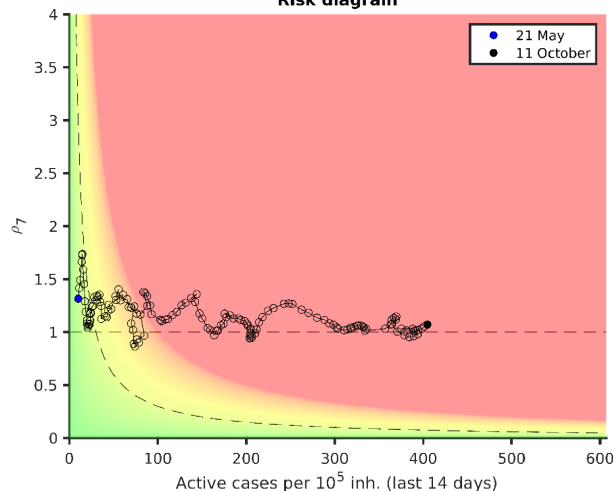
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 405 | 434 | 5.37 % |



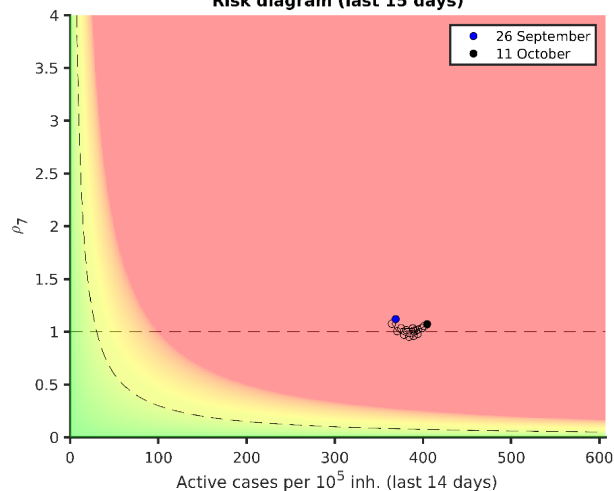
Actual $\rho_7 = 1.1$



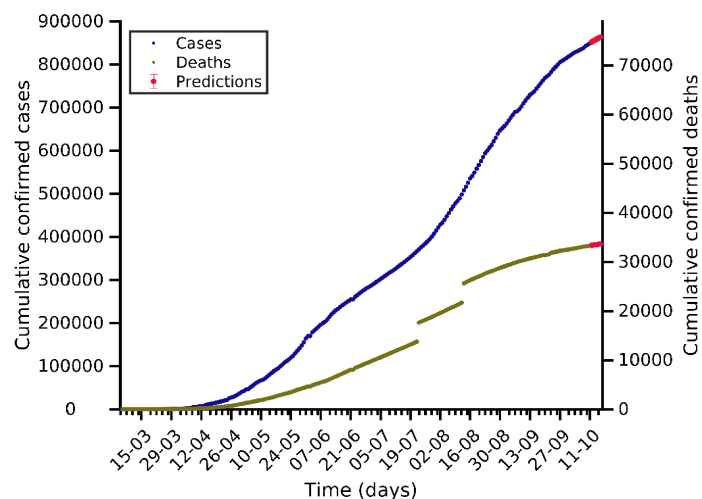
Risk diagram



Risk diagram (last 15 days)



Peru 11-10-2020. Pop: 33.0M. Cumulative incidence: 2576/10⁵

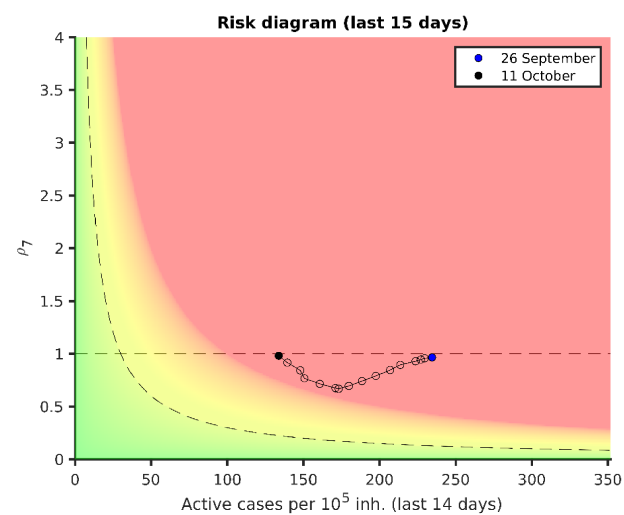
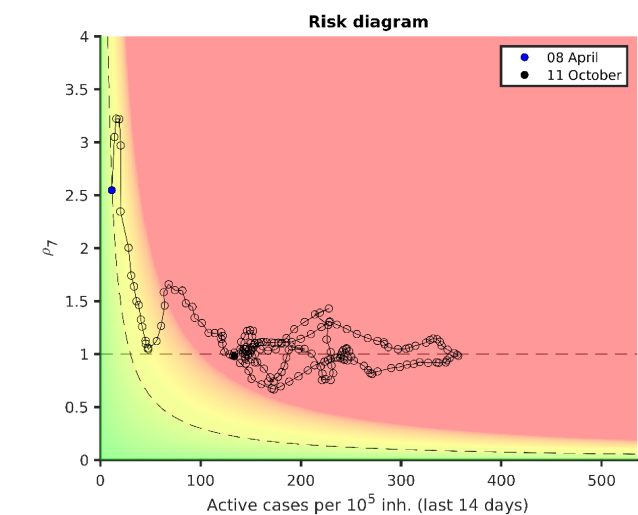
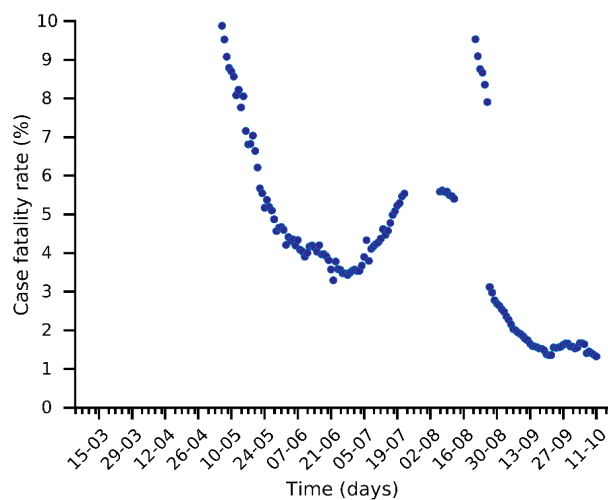
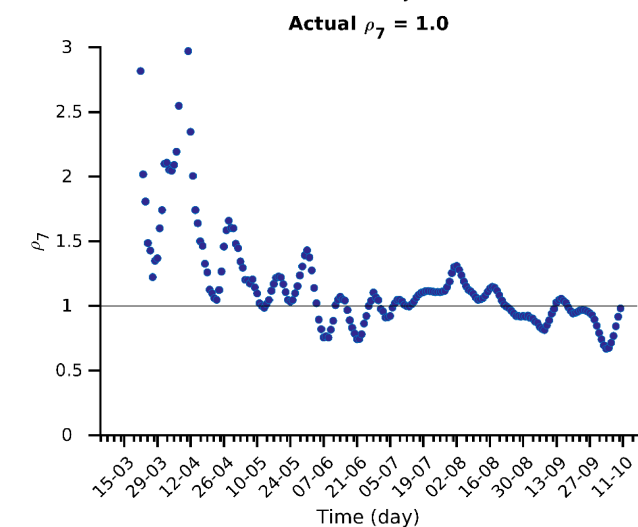
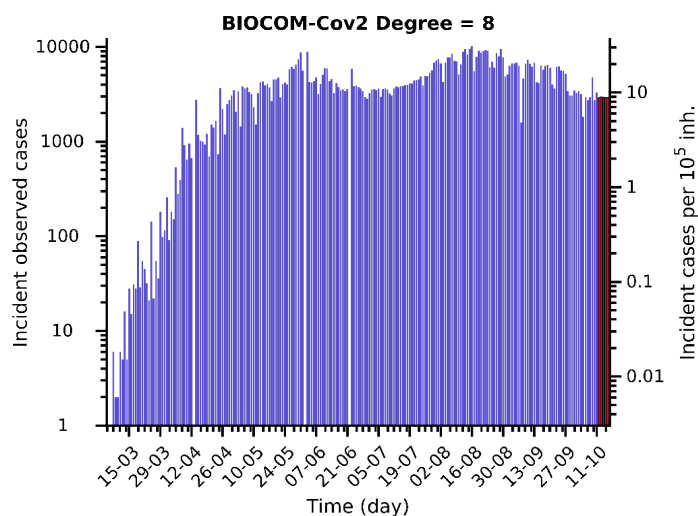
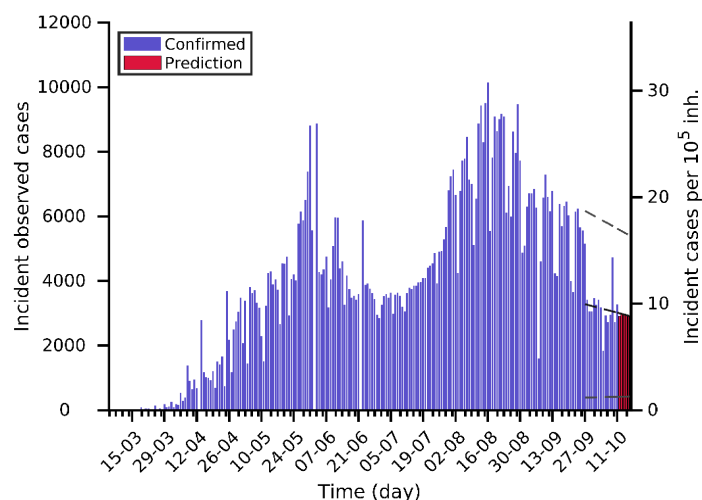


Predictions for next days

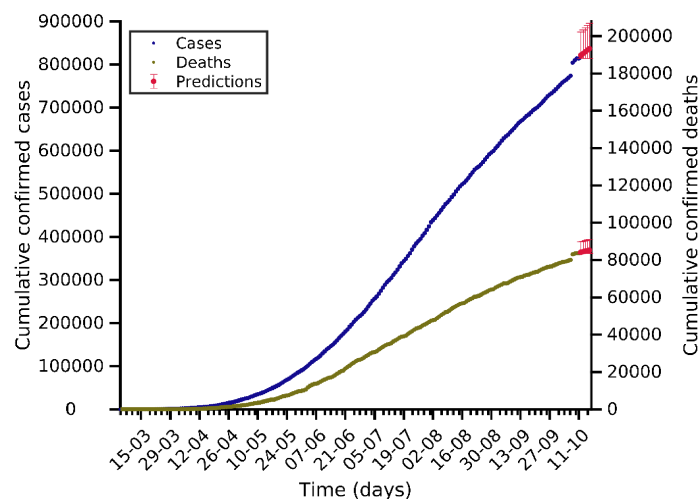
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 852281 (+2910) | [849371 - 855250] |
| 14-10-2020 | 858222 (+2961) | [855143 - 861302] |
| 16-10-2020 | 864088 (+2924) | [860778 - 867399] |

Current indicators

| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 134 | 131 | 1.32 % |



Mexico 11-10-2020. Pop: 128.9M. Cumulative incidence: 632/10⁵

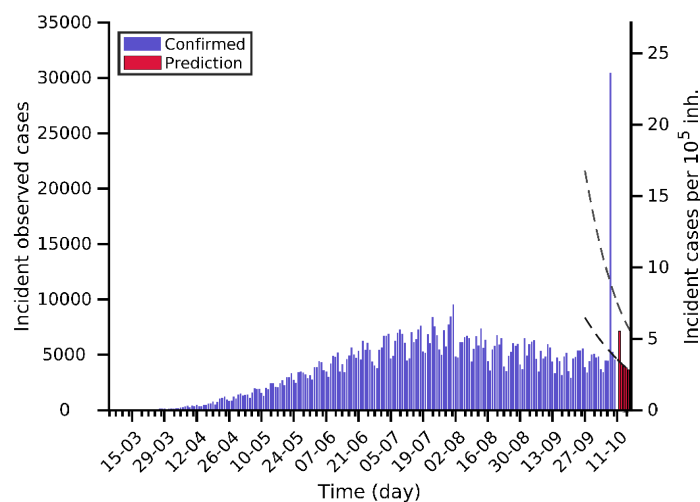


Predictions for next days

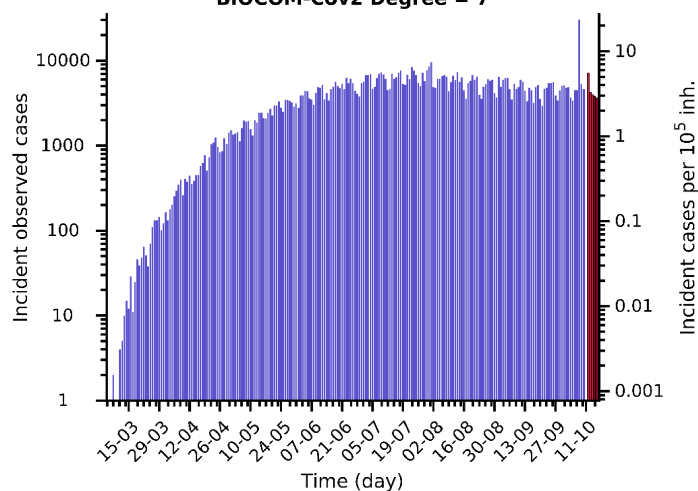
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 821473 (+7145) | [814328 - 875878] |
| 14-10-2020 | 829656 (+3997) | [814328 - 885563] |
| 16-10-2020 | 837114 (+3642) | [814328 - 895802] |

Current indicators

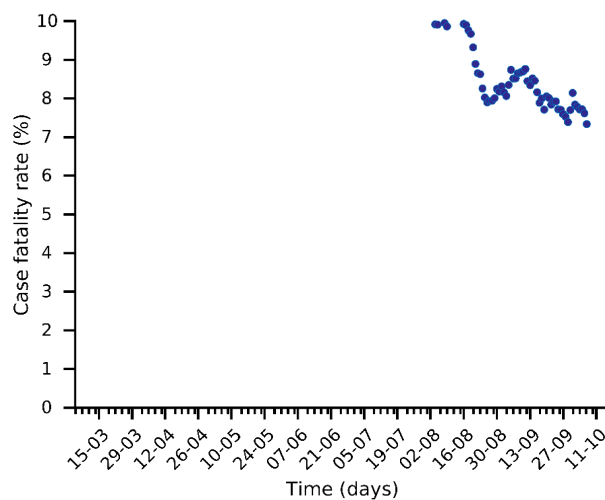
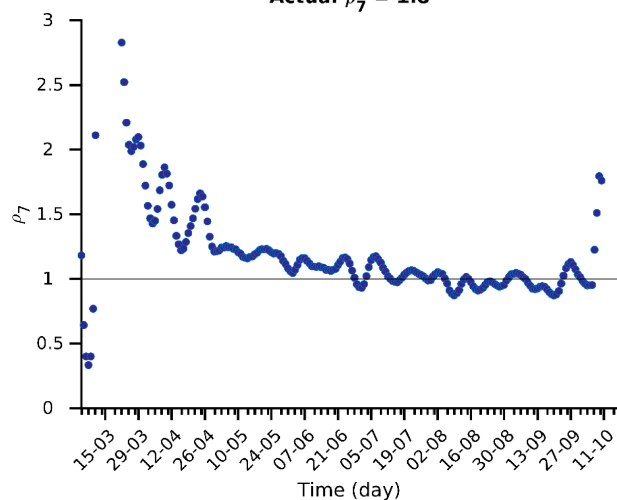
| A ₁₄ | EPG | CFR |
|-----------------|-----|---------|
| 65 | 115 | 10.00 % |



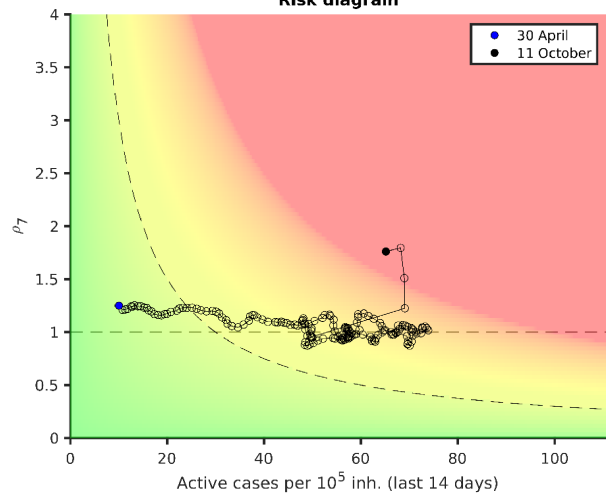
BIOCOM-Cov2 Degree = 7



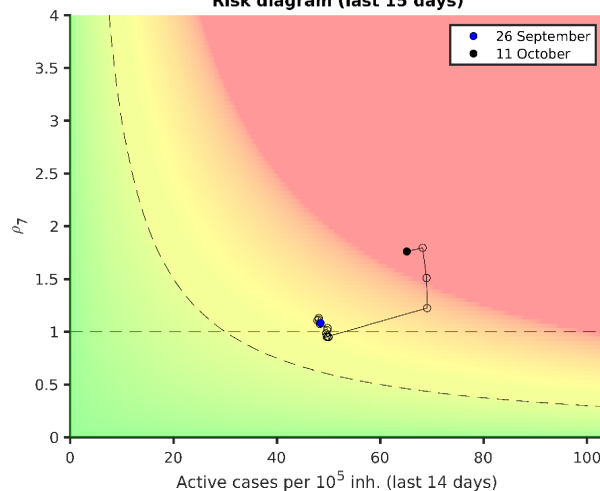
Actual $\rho_7 = 1.8$



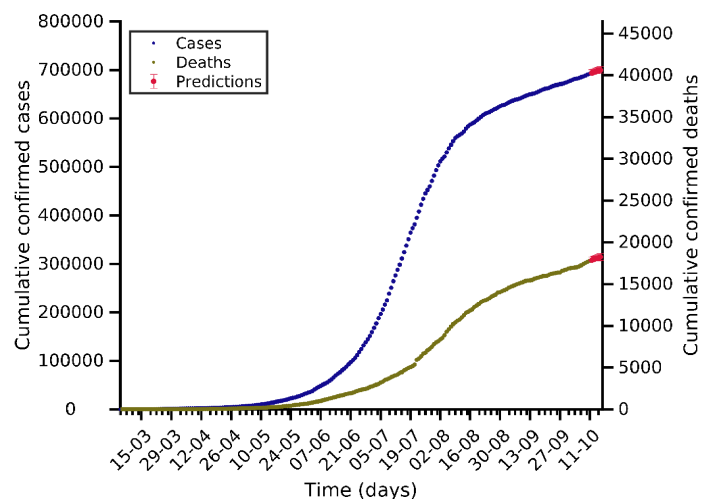
Risk diagram



Risk diagram (last 15 days)



South Africa 11-10-2020. Pop: 59.3M. Cumulative incidence: 1168/10⁵

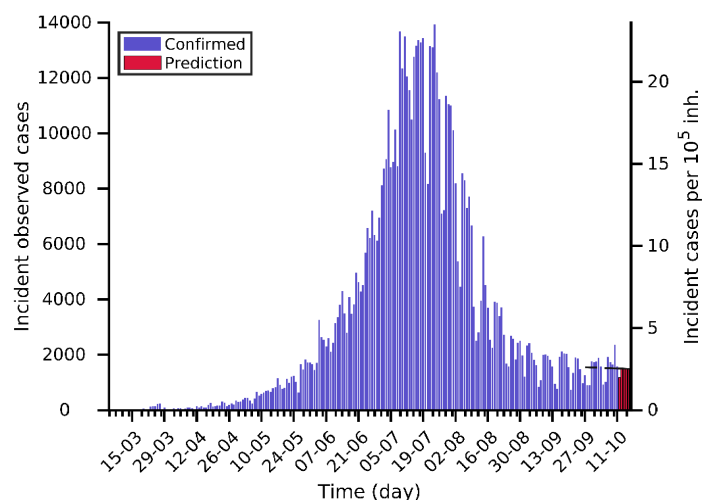


Predictions for next days

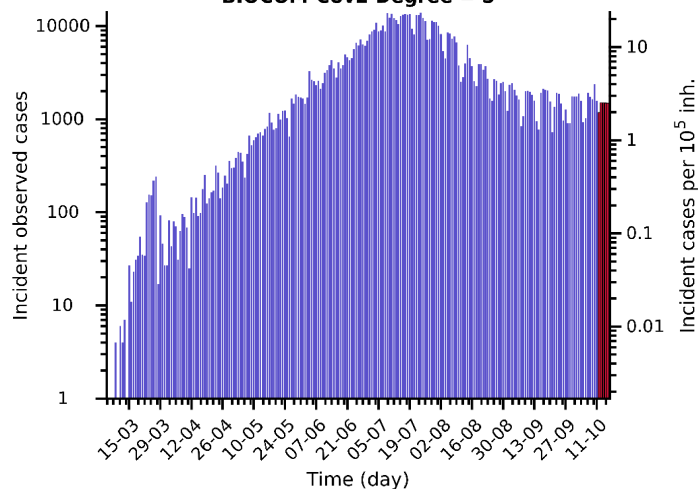
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 693649 (+1178) | [692471 - 700260] |
| 14-10-2020 | 696647 (+1497) | [692471 - 703510] |
| 16-10-2020 | 699632 (+1491) | [692471 - 707030] |

Current indicators

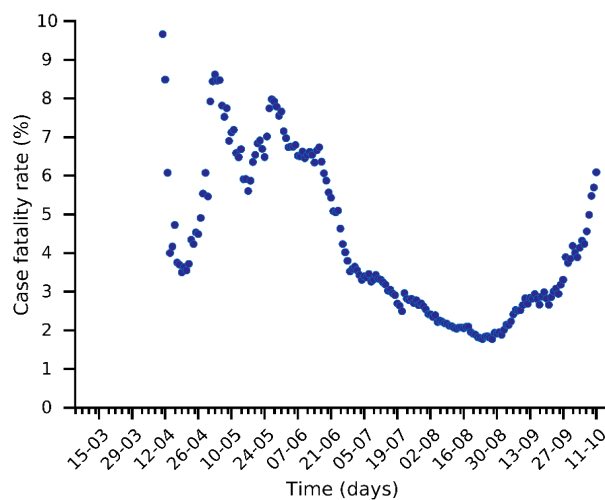
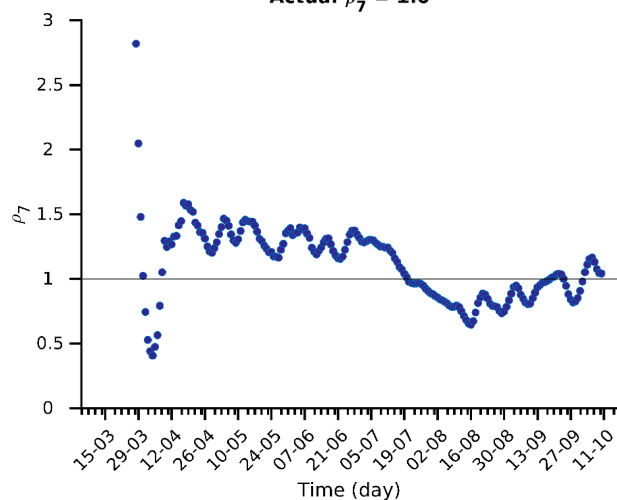
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 37 | 38 | 6.09 % |



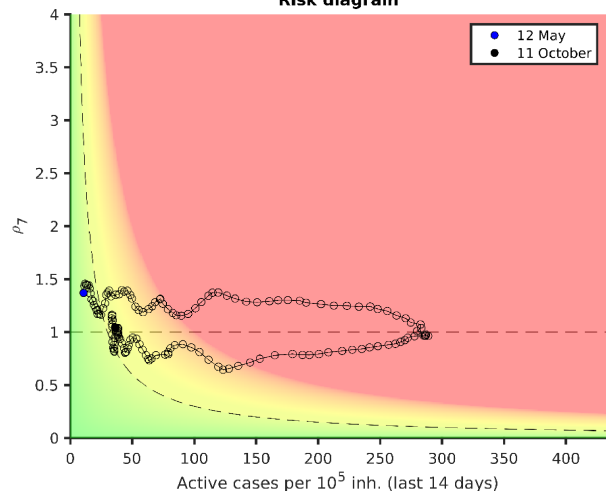
BIOCOM-Cov2 Degree = 5



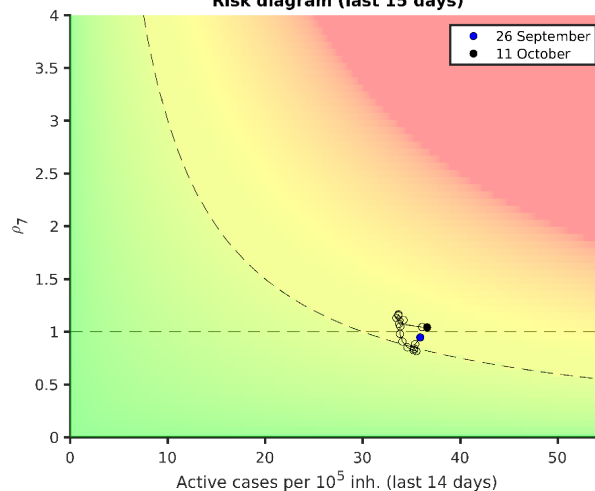
Actual $\rho_7 = 1.0$



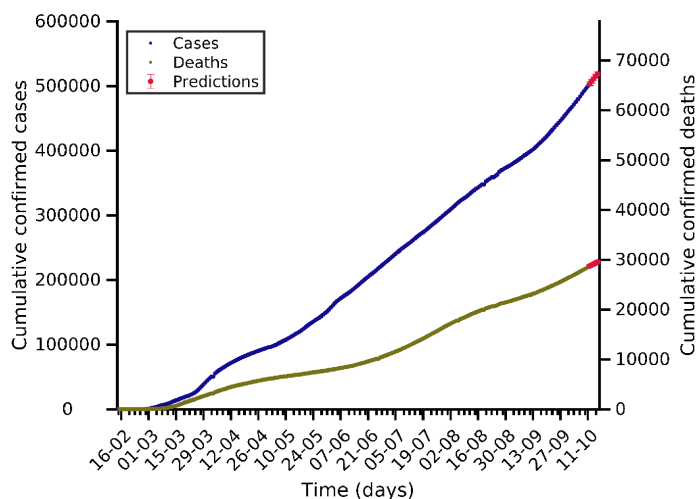
Risk diagram



Risk diagram (last 15 days)



Iran 11-10-2020. Pop: 84.0M. Cumulative incidence: 595/10⁵

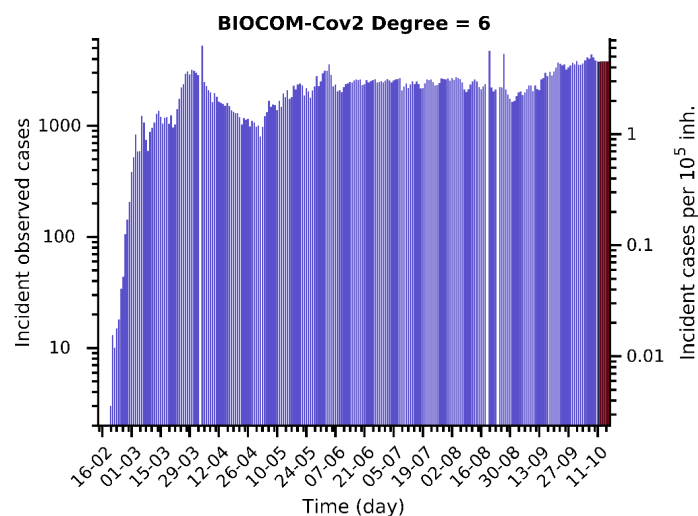
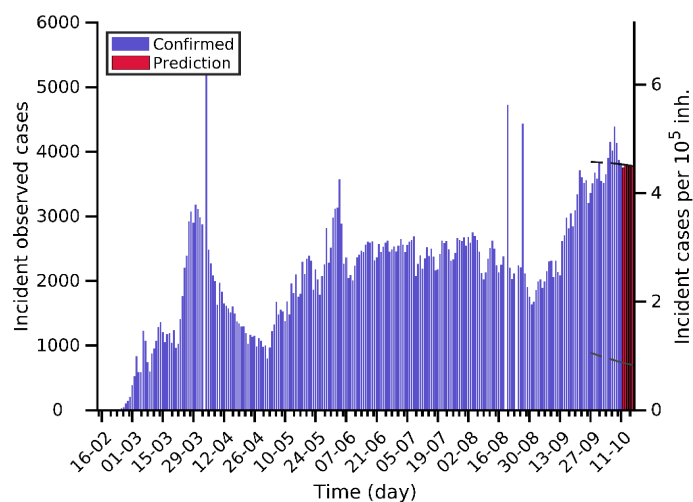


Predictions for next days

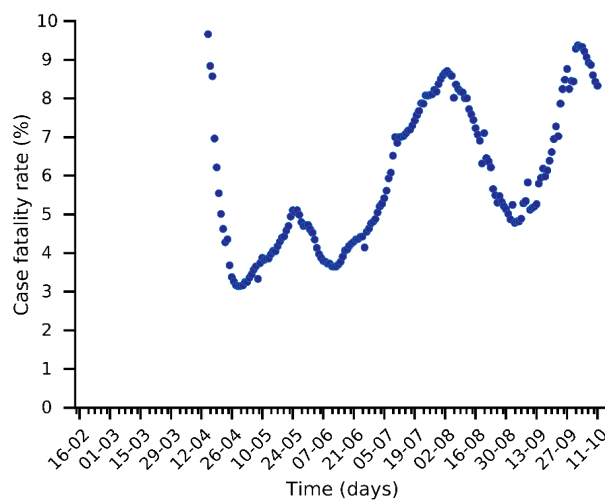
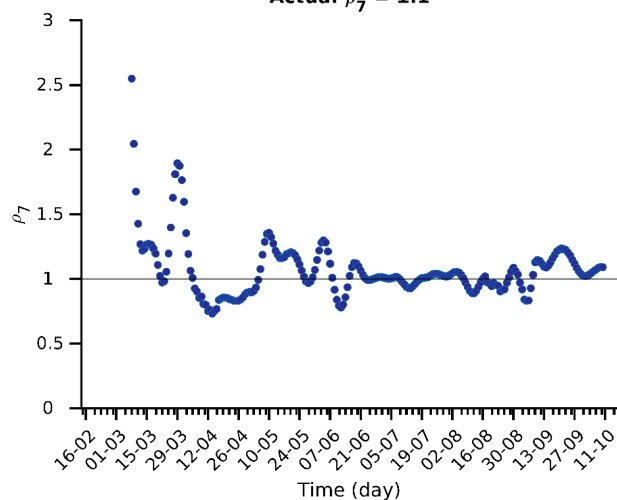
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 503828 (+3753) | [500957 - 506699] |
| 14-10-2020 | 511419 (+3793) | [508434 - 514403] |
| 16-10-2020 | 518989 (+3782) | [515763 - 522215] |

Current indicators

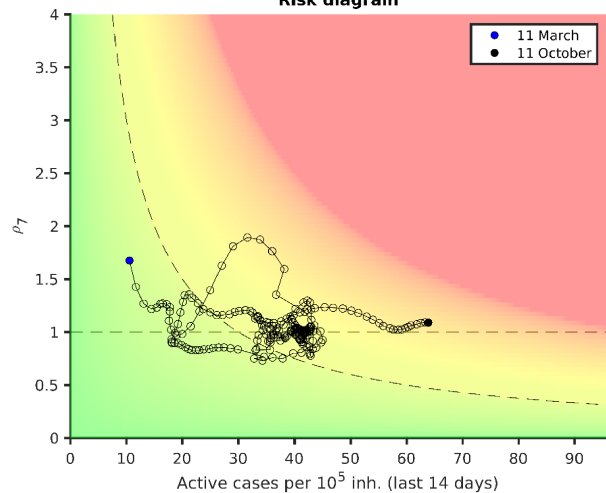
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 64 | 70 | 8.33 % |



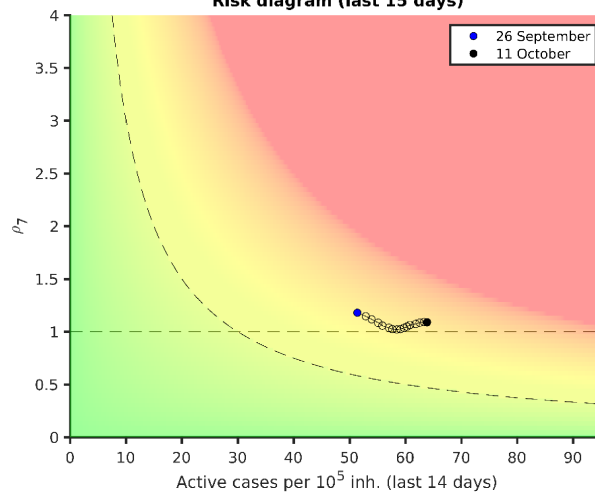
Actual $\rho_7 = 1.1$



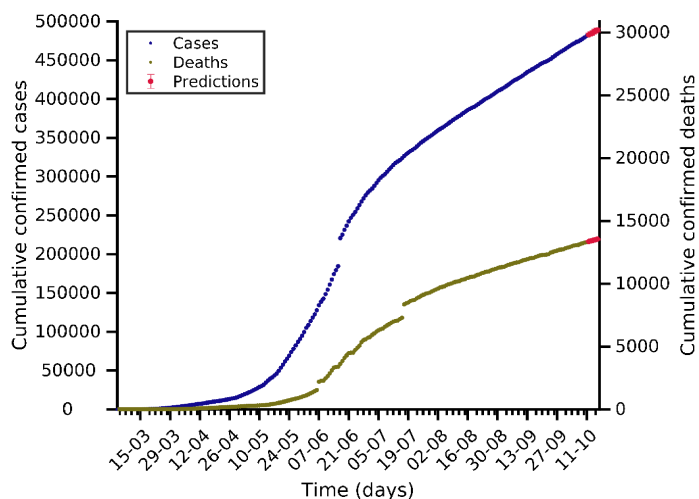
Risk diagram



Risk diagram (last 15 days)



Chile 11-10-2020. Pop: 19.1M. Cumulative incidence: 2518/10⁵

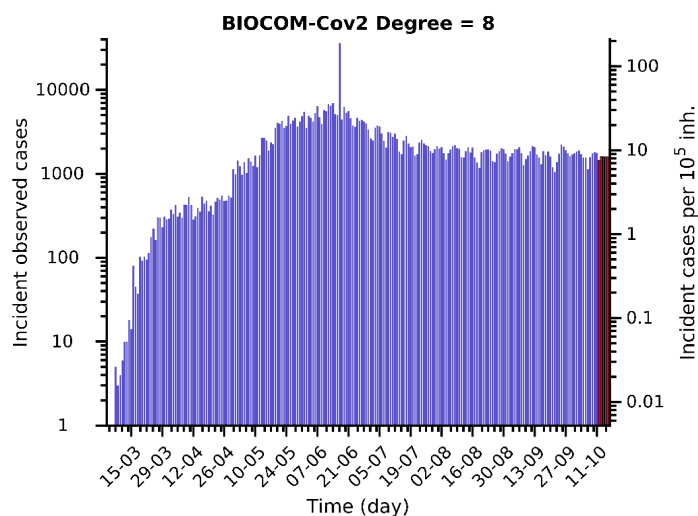
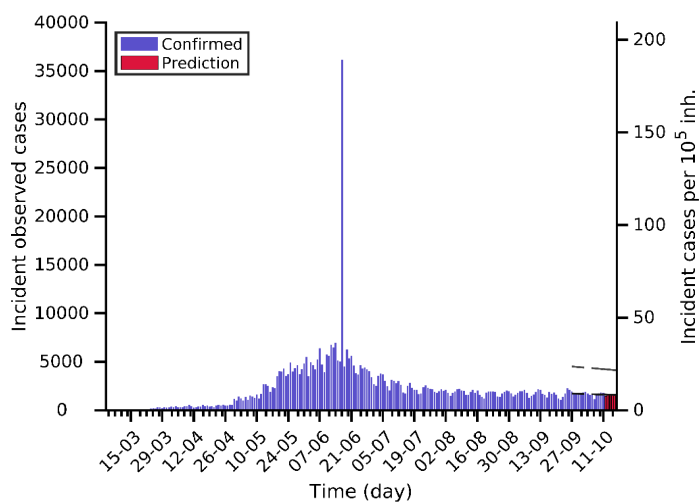


Predictions for next days

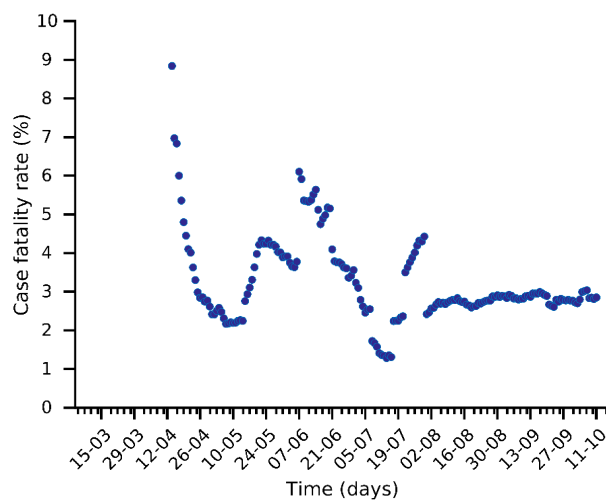
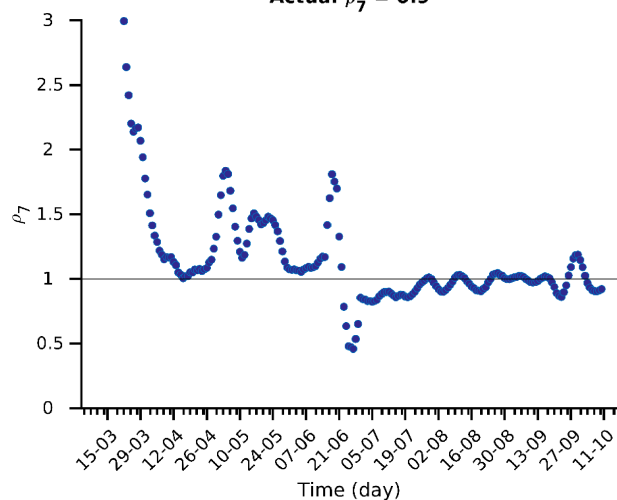
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 482807 (+1436) | [481371 - 485078] |
| 14-10-2020 | 486010 (+1598) | [483653 - 488367] |
| 16-10-2020 | 489184 (+1584) | [486647 - 491721] |

Current indicators

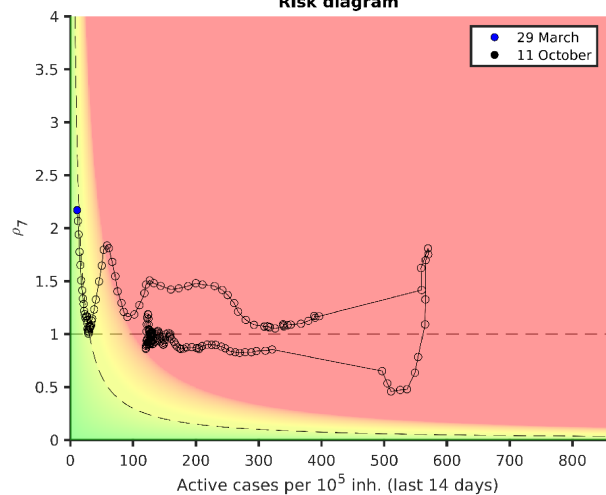
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 123 | 113 | 2.85 % |



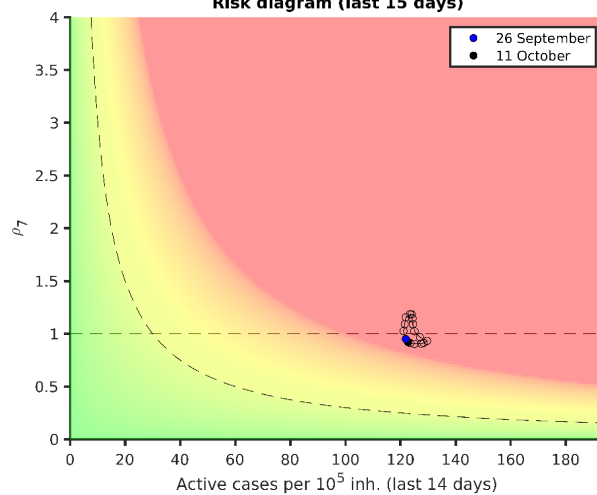
Actual $\rho_7 = 0.9$



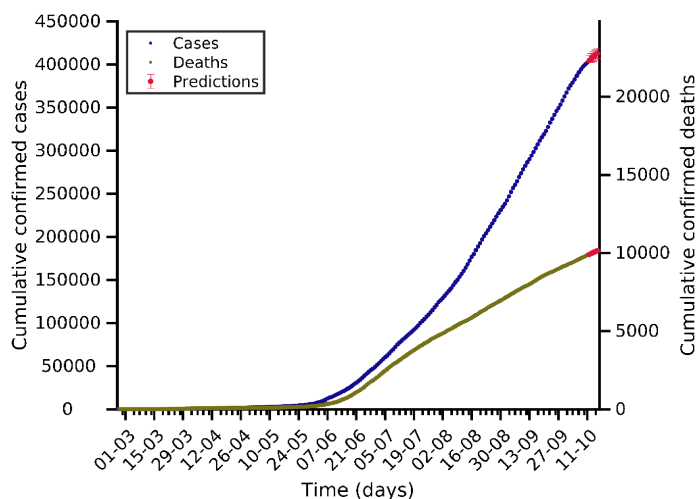
Risk diagram



Risk diagram (last 15 days)



Iraq 11-10-2020. Pop: 40.2M. Cumulative incidence: 1000/10⁵

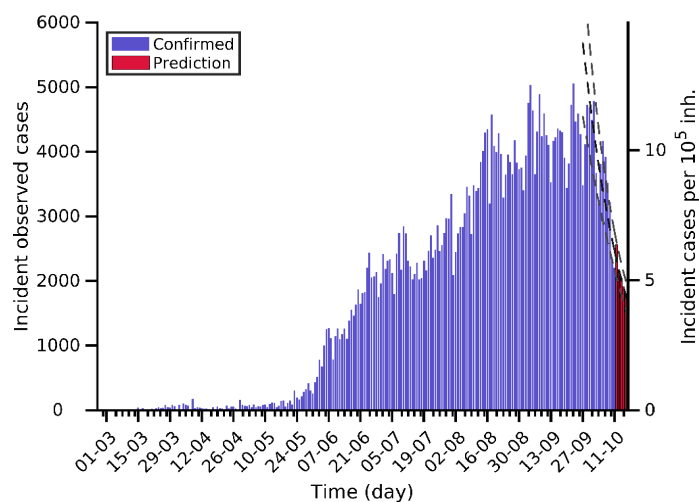


Predictions for next days

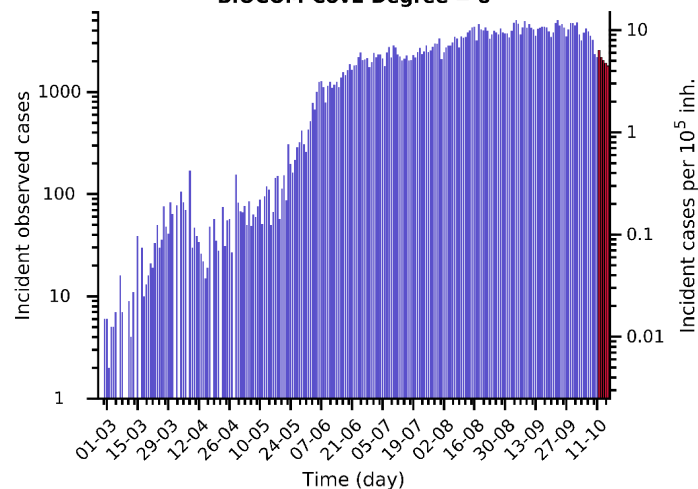
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 404893 (+2563) | [402330 - 410514] |
| 14-10-2020 | 409110 (+2040) | [403355 - 414865] |
| 16-10-2020 | 412812 (+1791) | [406823 - 418802] |

Current indicators

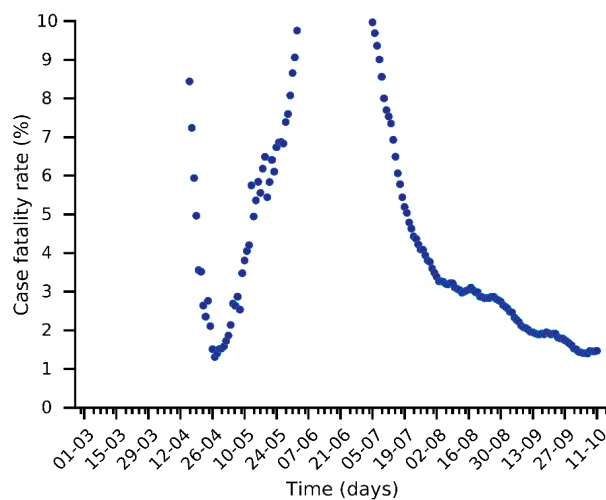
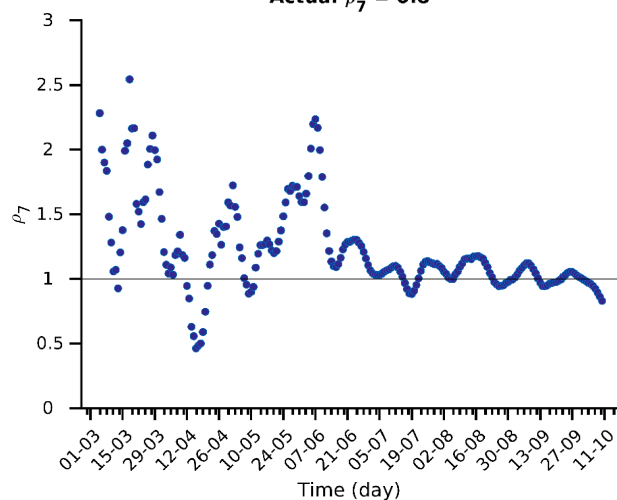
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 131 | 109 | 1.47 % |



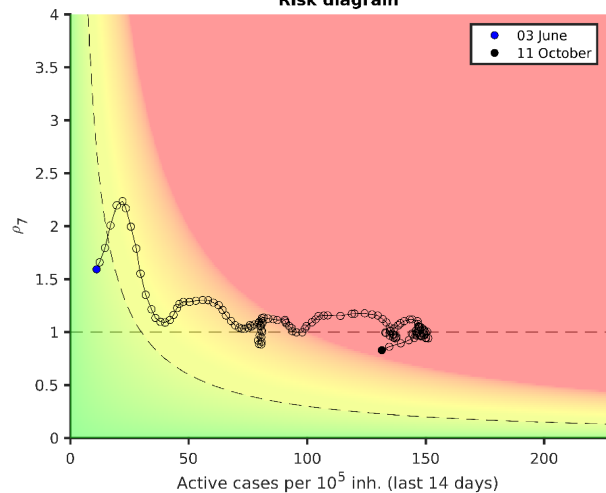
BIOCOM-Cov2 Degree = 8



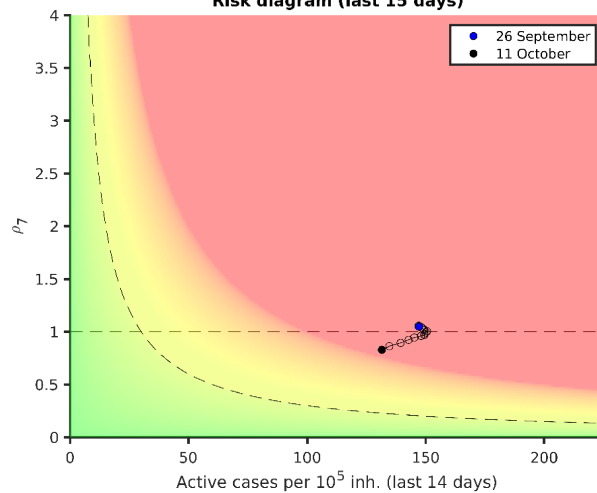
Actual $\rho_7 = 0.8$



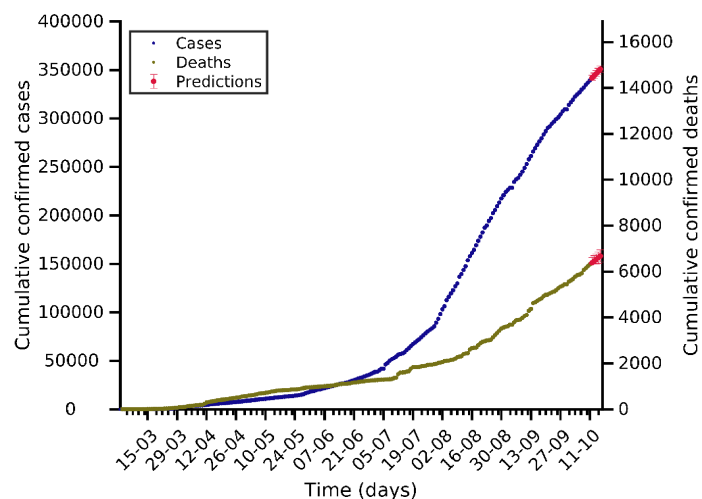
Risk diagram



Risk diagram (last 15 days)



Philippines 11-10-2020. Pop: 109.6M. Cumulative incidence: 310/10⁵

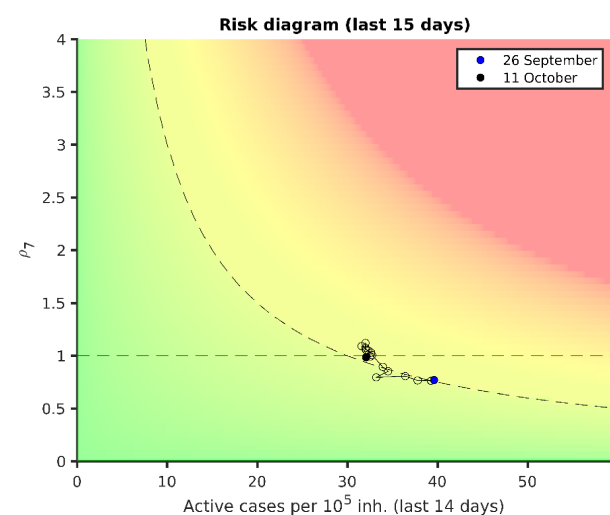
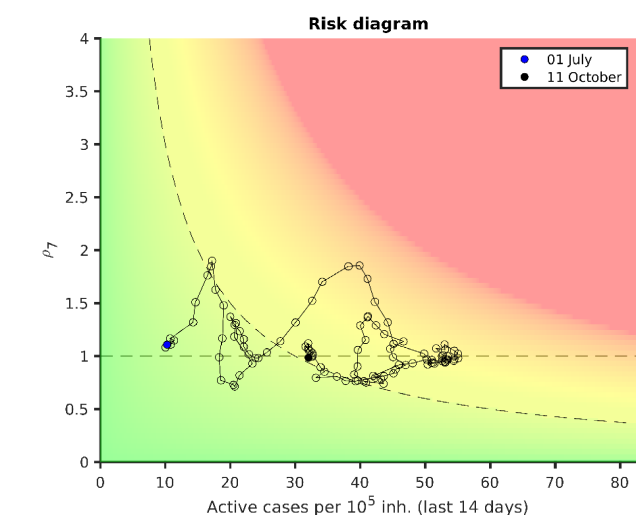
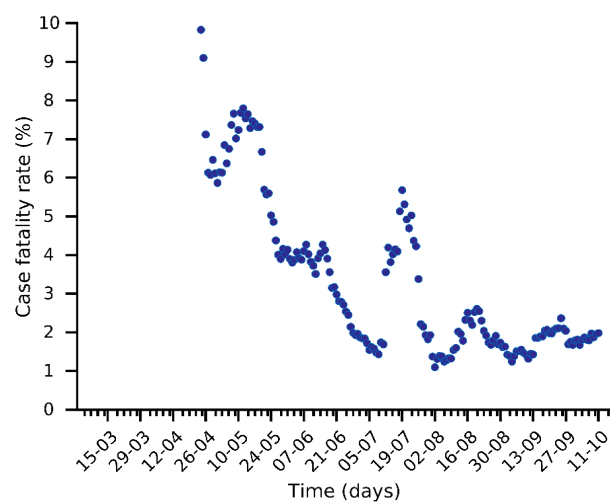
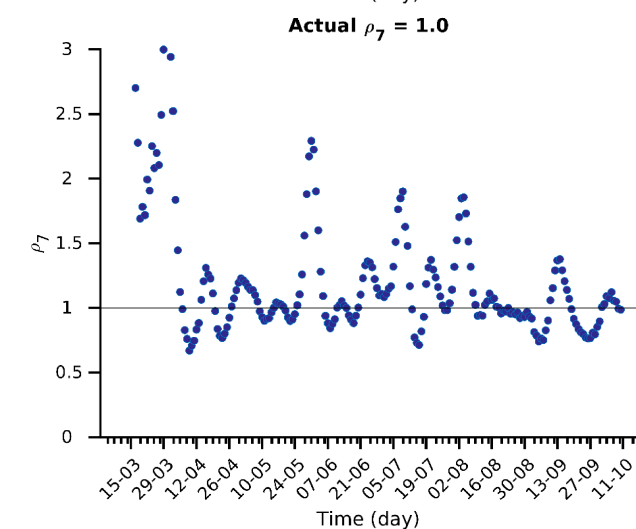
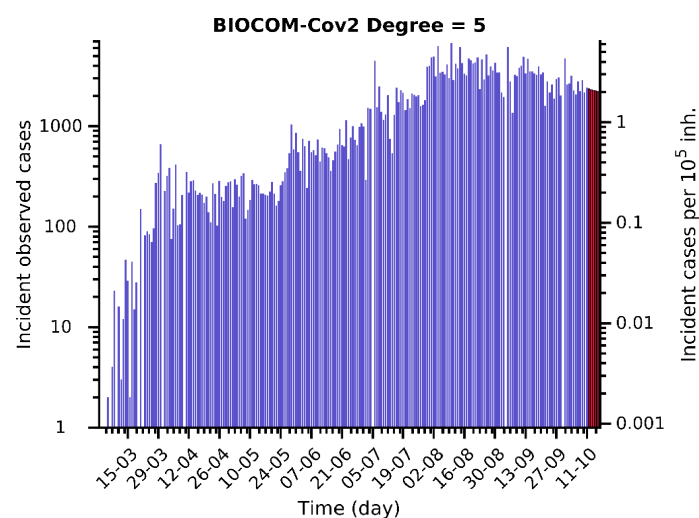
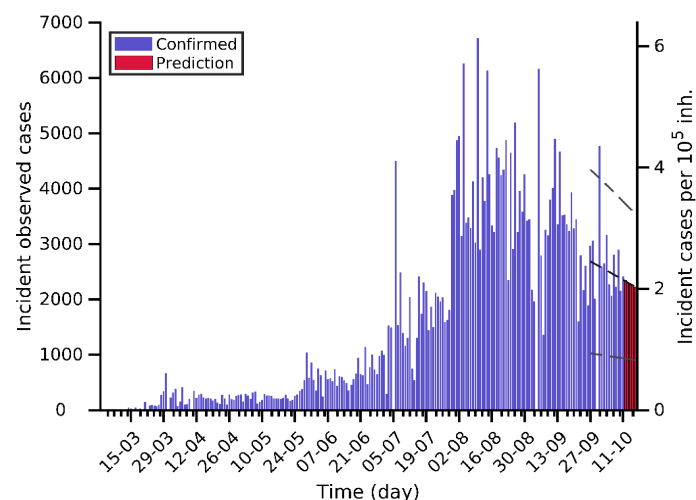


Predictions for next days

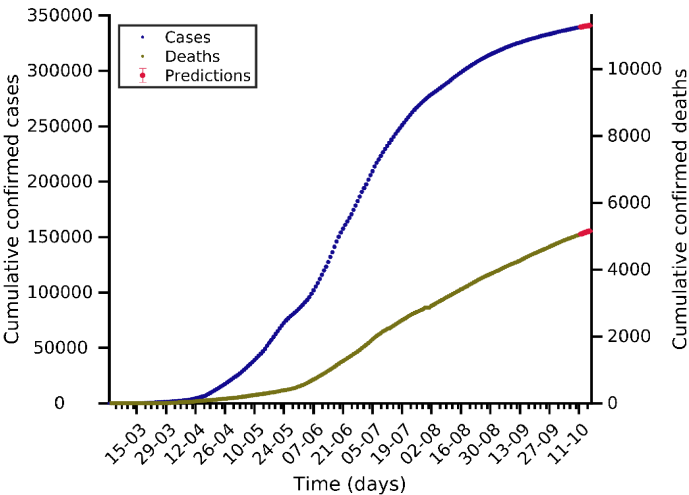
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 341690 (+2349) | [339341 - 344679] |
| 14-10-2020 | 346272 (+2279) | [343174 - 349371] |
| 16-10-2020 | 350756 (+2230) | [347431 - 354082] |

Current indicators

| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 32 | 32 | 1.98 % |

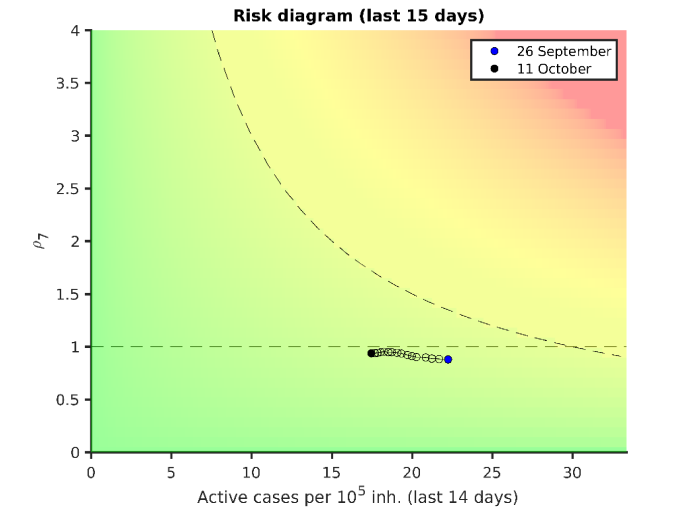
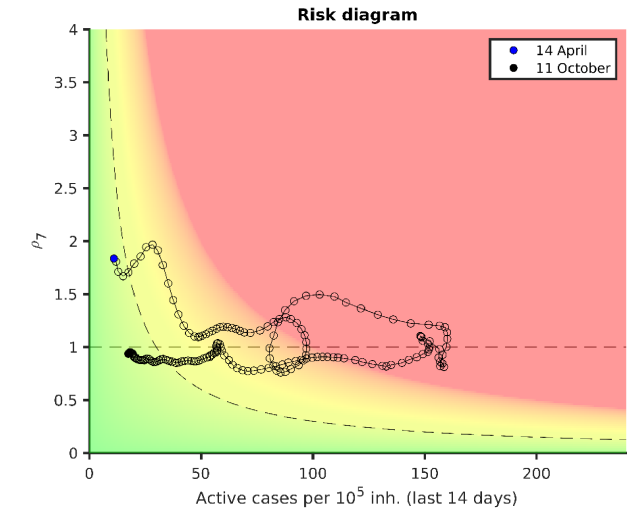
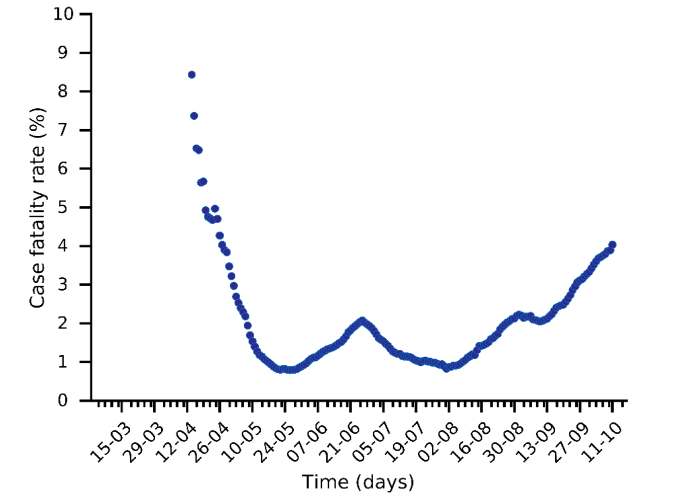
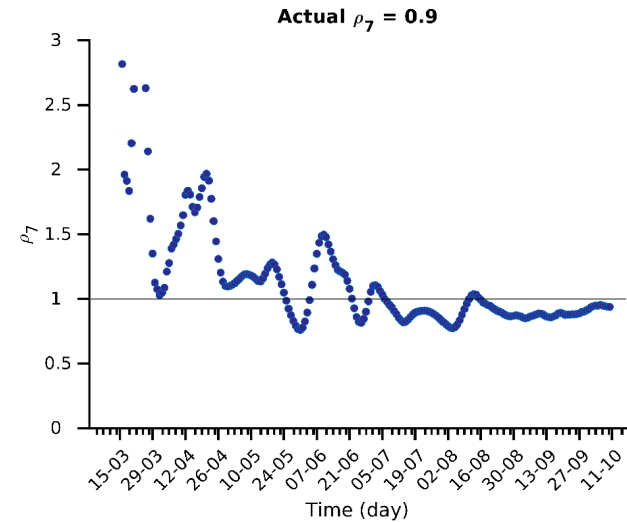
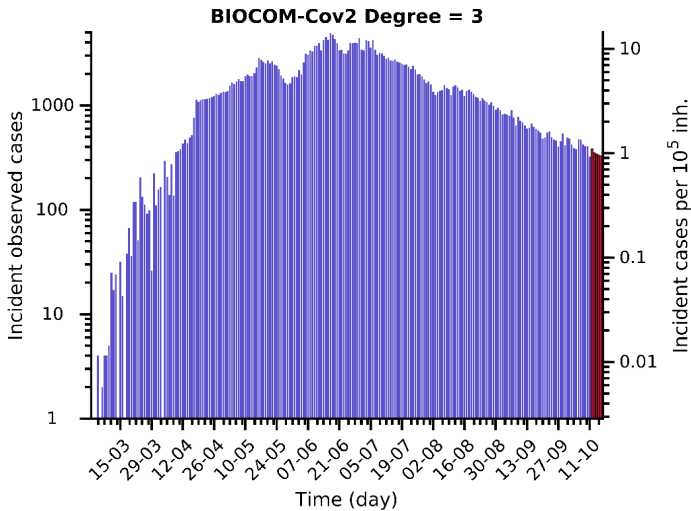
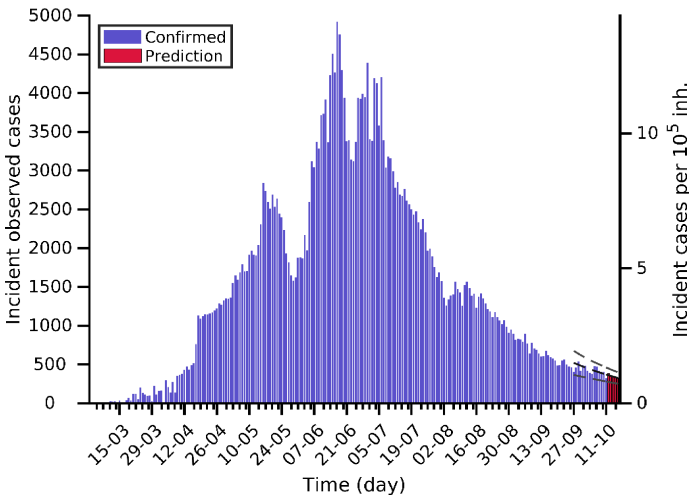


Saudi Arabia 11-10-2020. Pop: 34.8M. Cumulative incidence: 975/10⁵

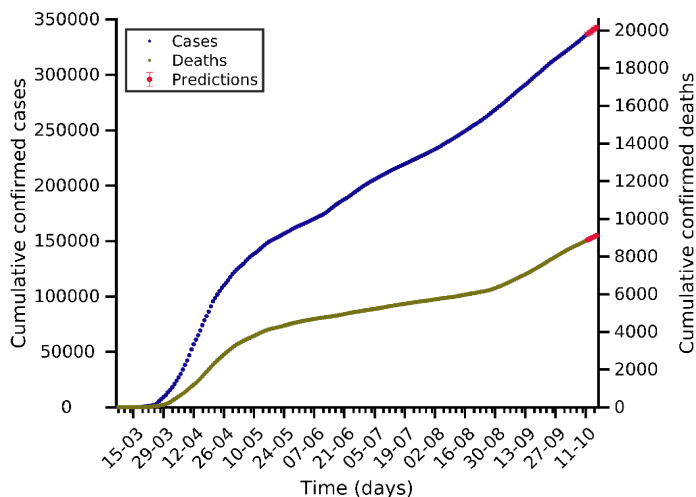


| Predictions for next days | | |
|---------------------------|-----------------|-------------------------|
| Day | Number of cases | 95% Confidence Interval |
| 12-10-2020 | 339648 (+381) | [339292 - 340004] |
| 14-10-2020 | 340344 (+343) | [339976 - 340711] |
| 16-10-2020 | 341005 (+327) | [340615 - 341395] |

| Current indicators | | |
|--------------------|-----|--------|
| A ₁₄ | EPG | CFR |
| 17 | 16 | 4.03 % |



Turkey 11-10-2020. Pop: 84.3M. Cumulative incidence: 398/10⁵

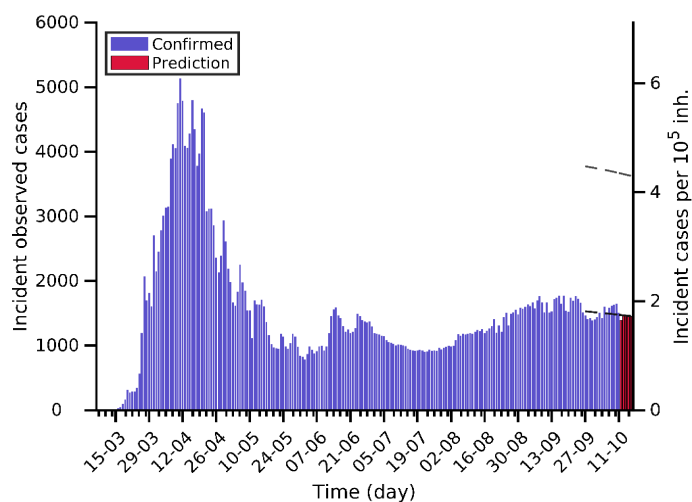


Predictions for next days

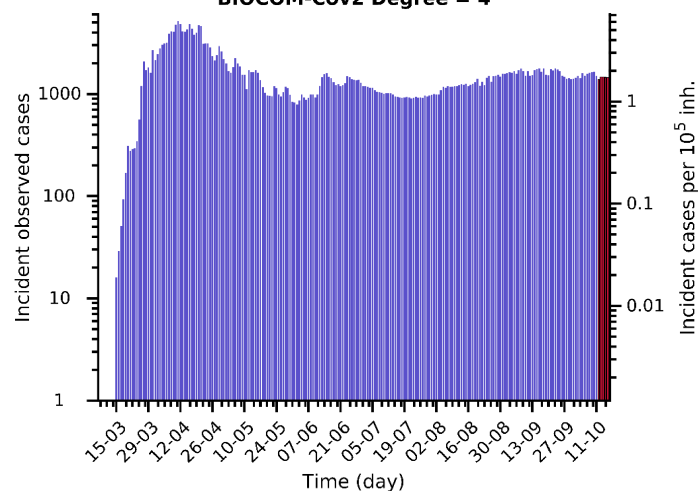
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 336924 (+1391) | [335533 - 338651] |
| 14-10-2020 | 339856 (+1464) | [338064 - 341649] |
| 16-10-2020 | 342772 (+1456) | [340839 - 344705] |

Current indicators

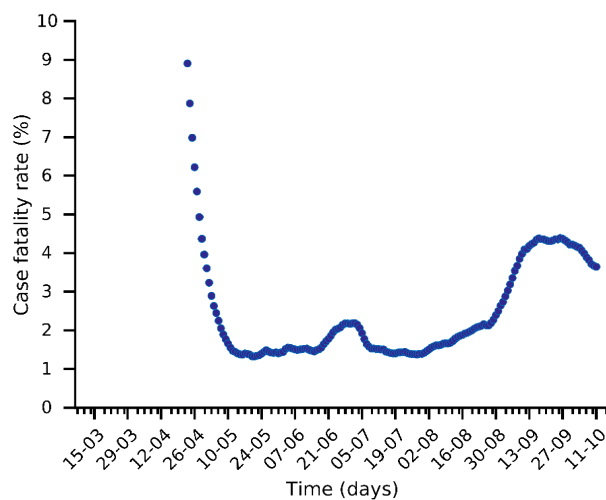
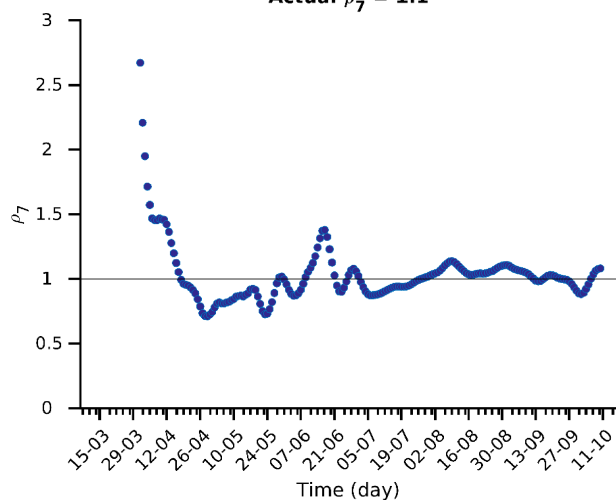
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 25 | 27 | 3.64 % |



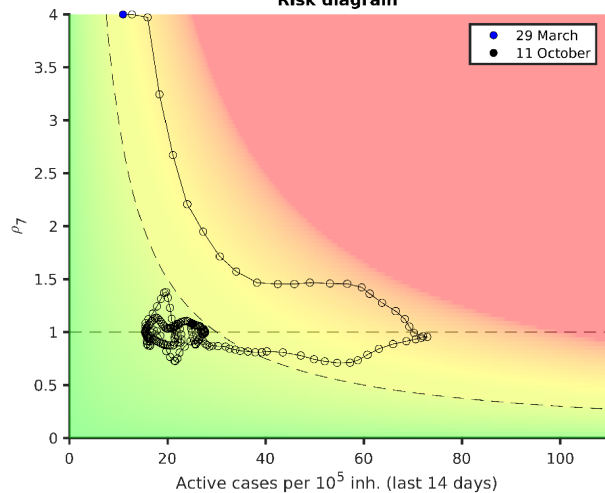
BIOCOM-Cov2 Degree = 4



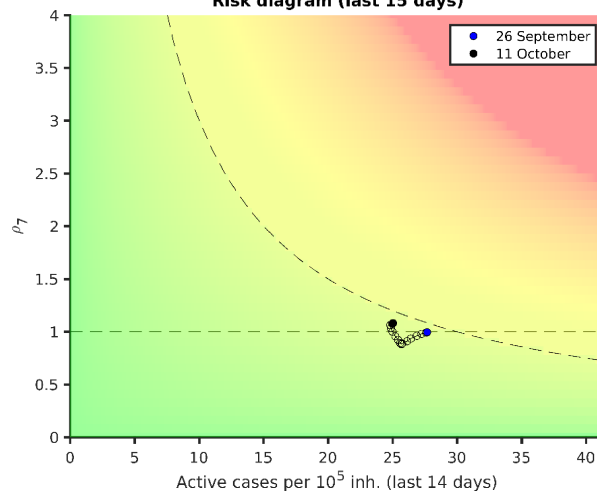
Actual $\rho_7 = 1.1$



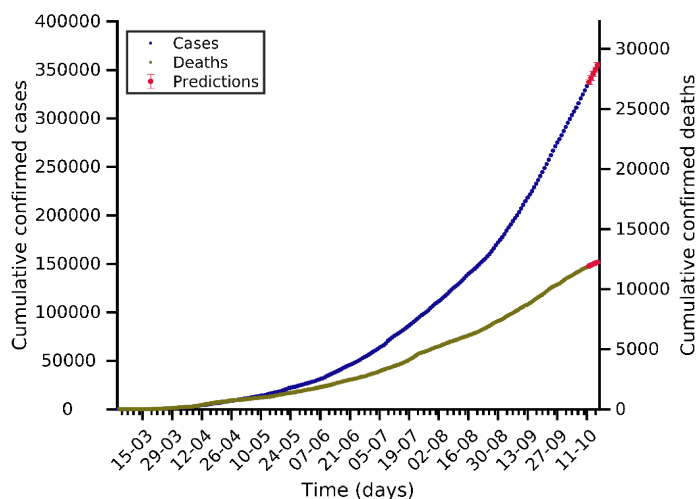
Risk diagram



Risk diagram (last 15 days)



Indonesia 11-10-2020. Pop: 273.5M. Cumulative incidence: 122/10⁵

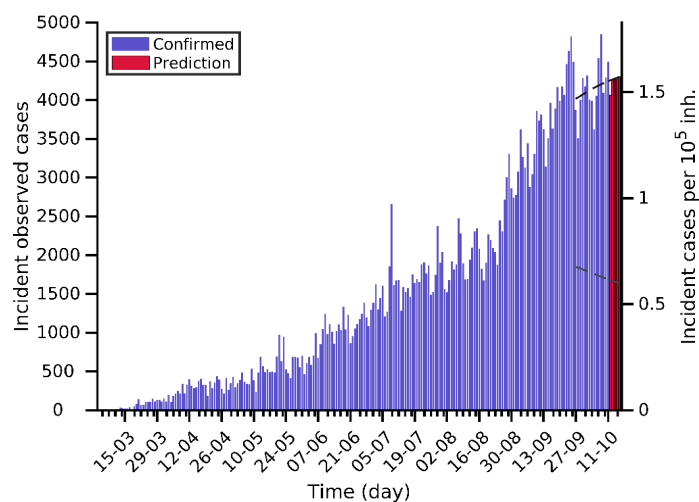


Predictions for next days

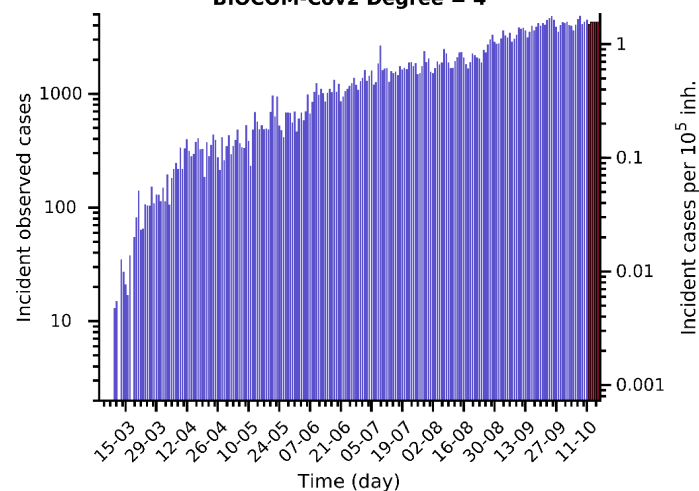
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 337514 (+4065) | [335001 - 340026] |
| 14-10-2020 | 346061 (+4279) | [343444 - 348677] |
| 16-10-2020 | 354652 (+4301) | [351808 - 357495] |

Current indicators

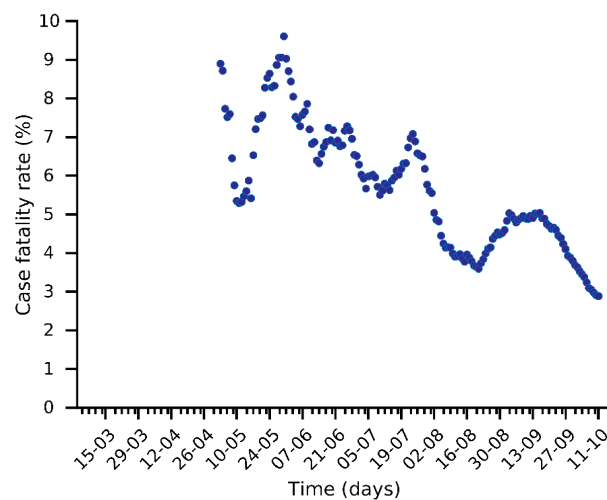
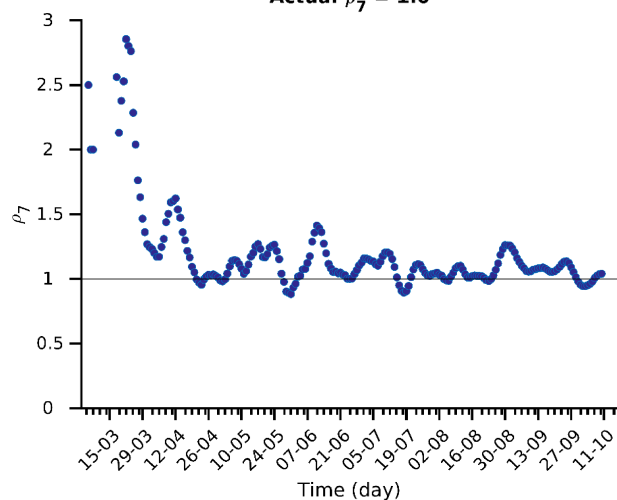
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 21 | 22 | 2.88 % |



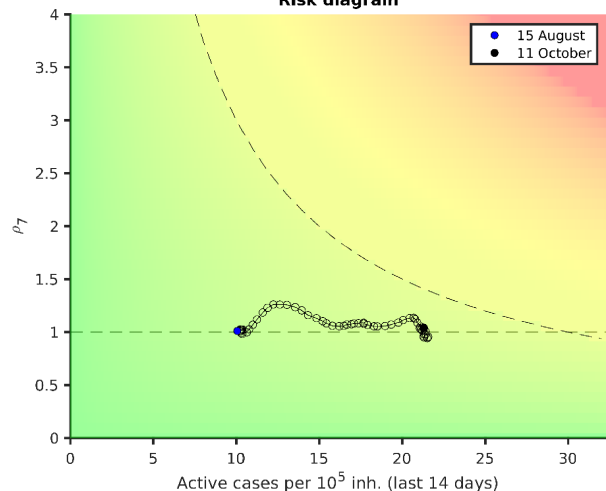
BIOCOM-Cov2 Degree = 4



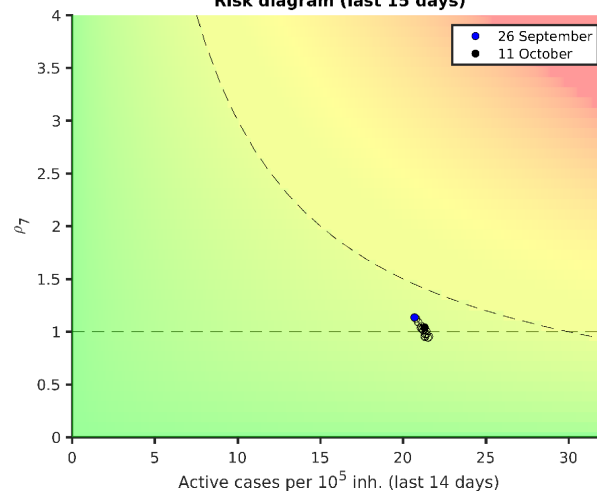
Actual $\rho_7 = 1.0$



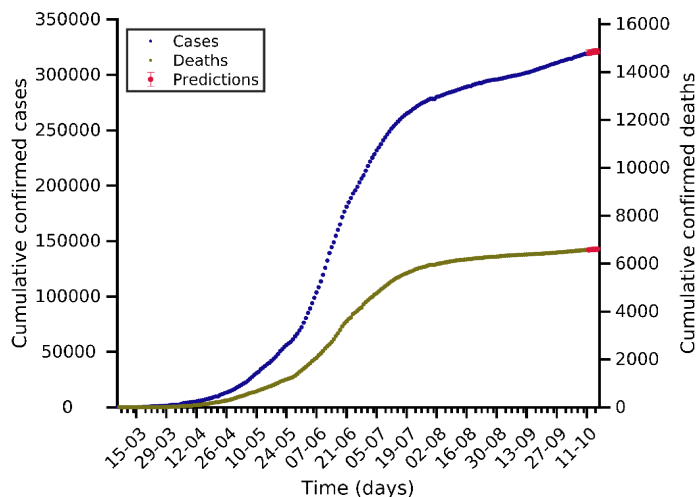
Risk diagram



Risk diagram (last 15 days)



Pakistan 11-10-2020. Pop: 220.9M. Cumulative incidence: 144/10⁵

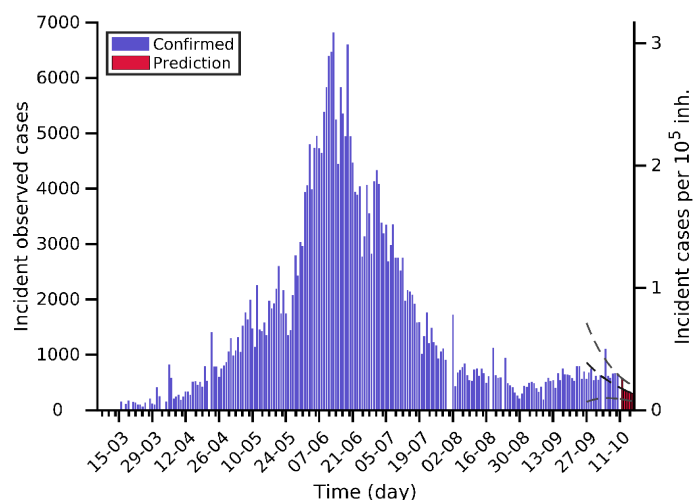


Predictions for next days

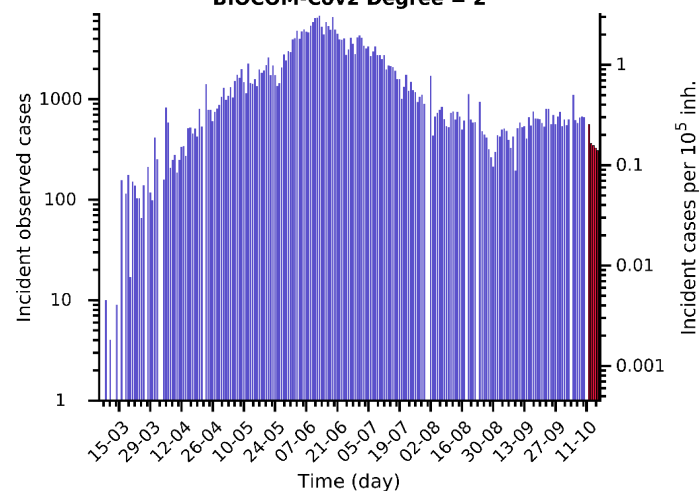
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 319495 (+563) | [318932 - 322342] |
| 14-10-2020 | 320204 (+345) | [318932 - 323122] |
| 16-10-2020 | 320838 (+309) | [318932 - 323885] |

Current indicators

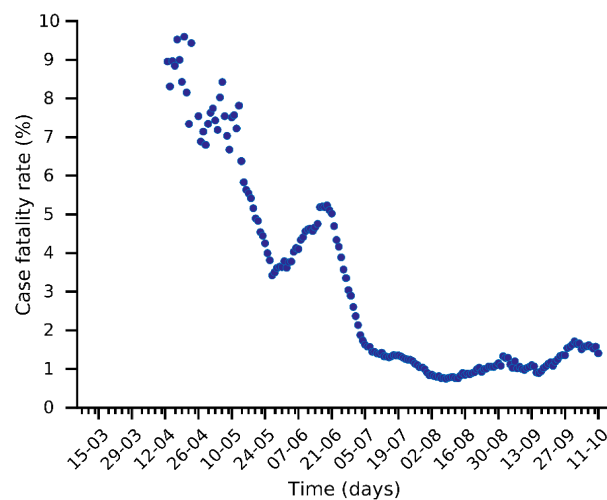
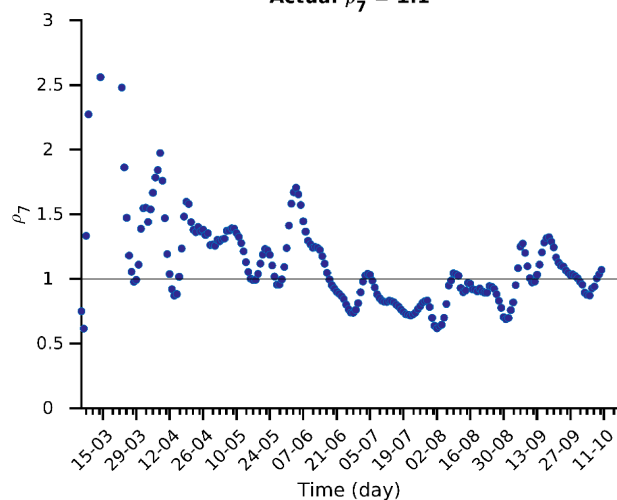
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 4 | 4 | 1.41 % |



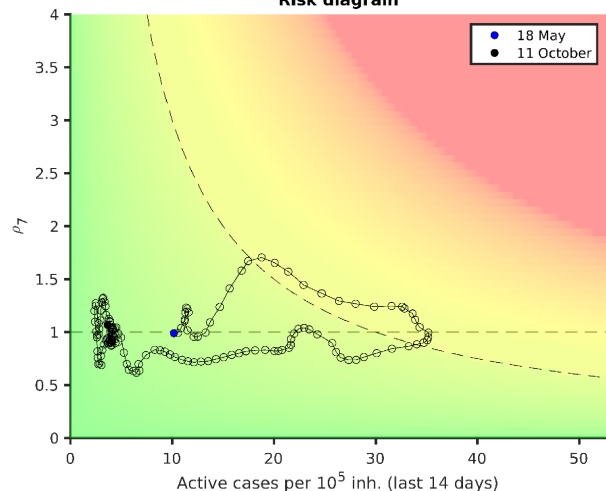
BIOCOM-Cov2 Degree = 2



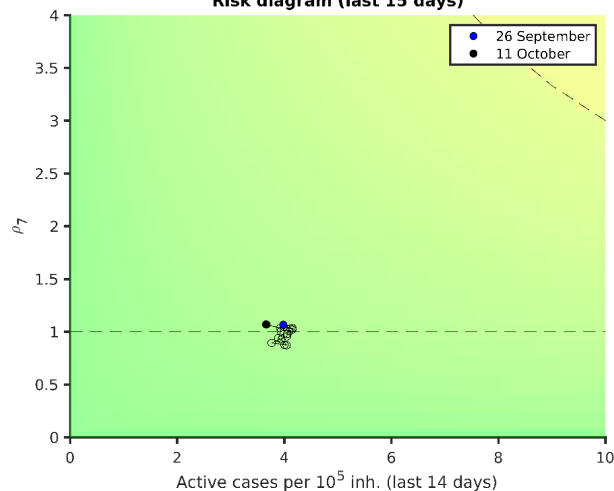
Actual $\rho_7 = 1.1$



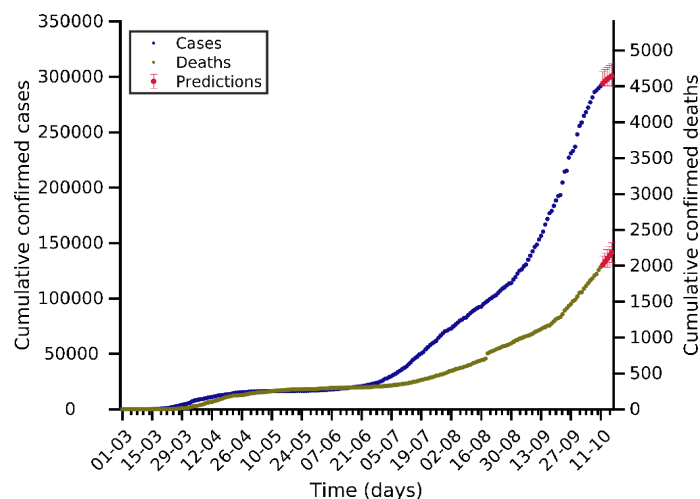
Risk diagram



Risk diagram (last 15 days)



Israel 11-10-2020. Pop: 8.7M. Cumulative incidence: 3372/10⁵

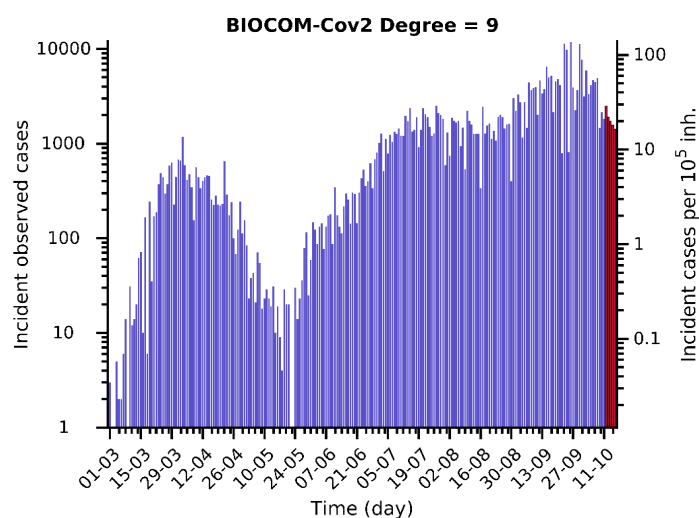
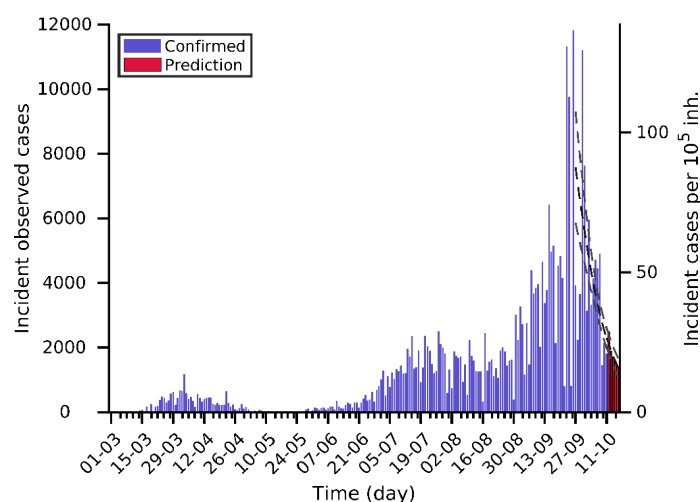


Predictions for next days

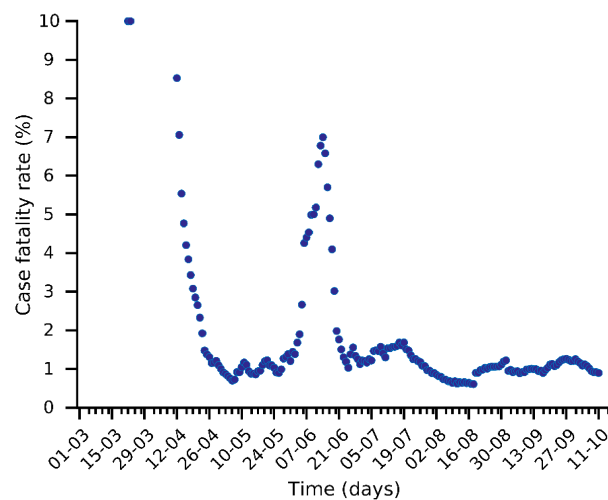
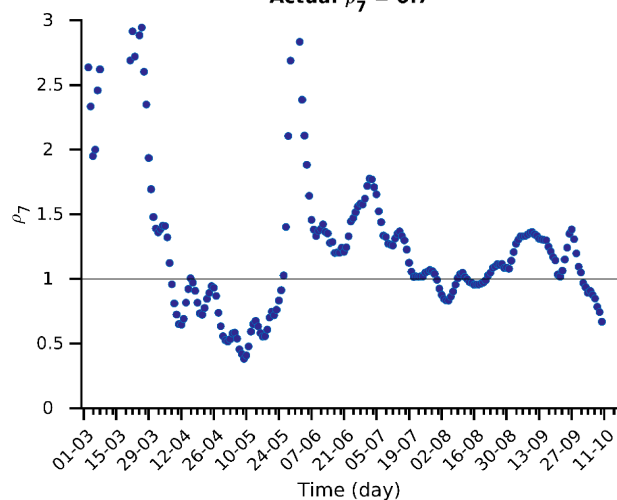
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 294319 (+2491) | [291828 - 304687] |
| 14-10-2020 | 297938 (+1722) | [291828 - 308498] |
| 16-10-2020 | 300915 (+1416) | [291828 - 311780] |

Current indicators

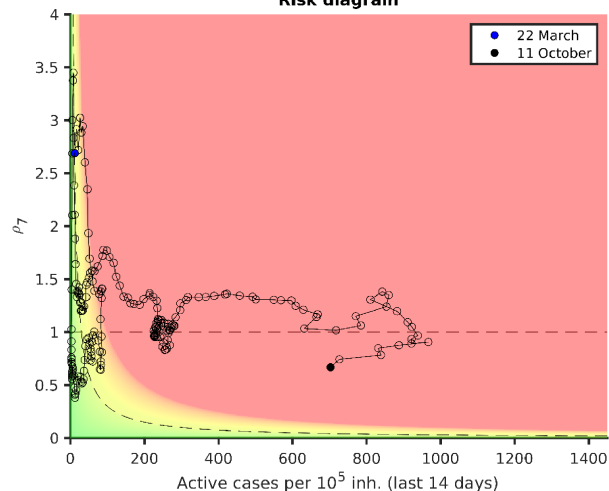
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 702 | 470 | 0.89 % |



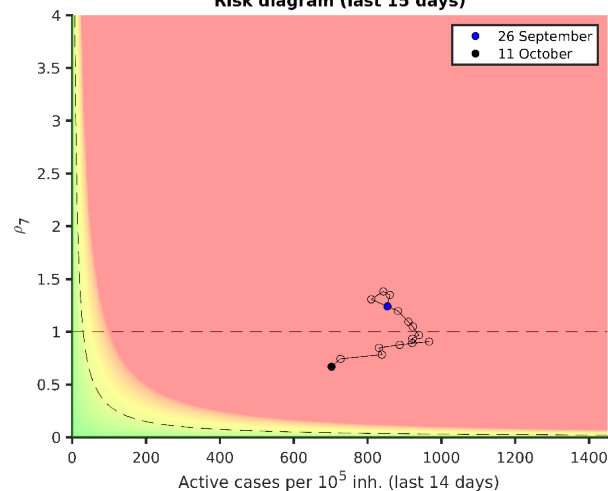
Actual $\rho_7 = 0.7$



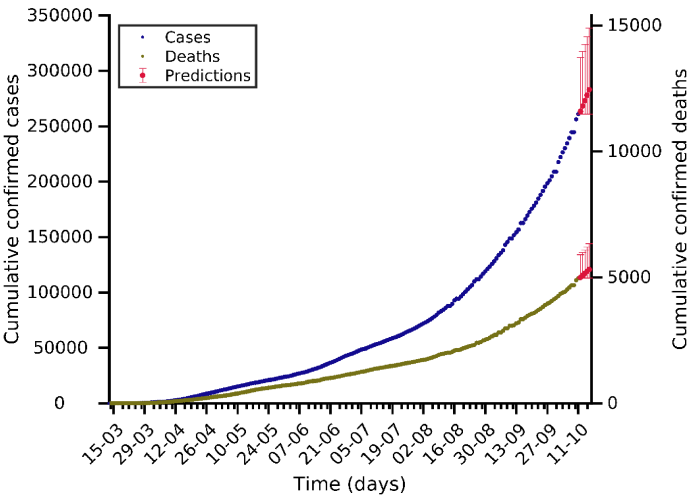
Risk diagram



Risk diagram (last 15 days)

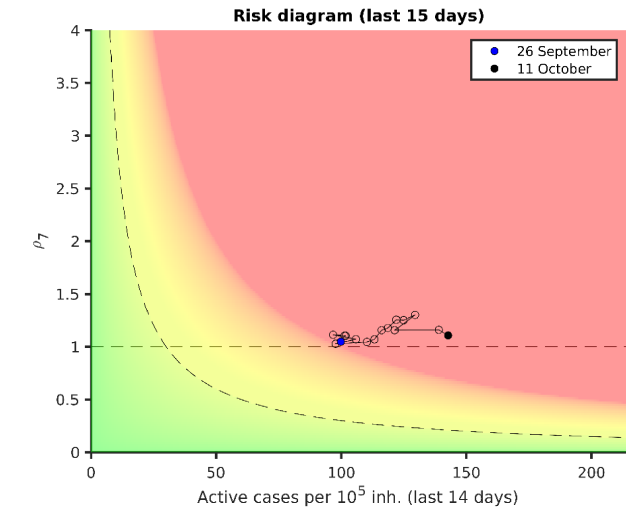
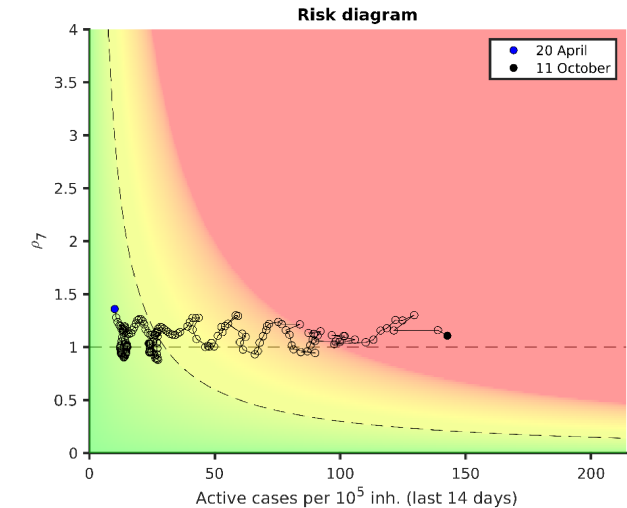
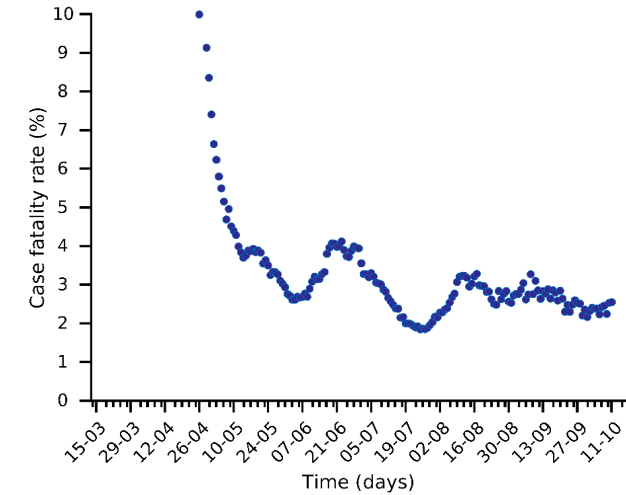
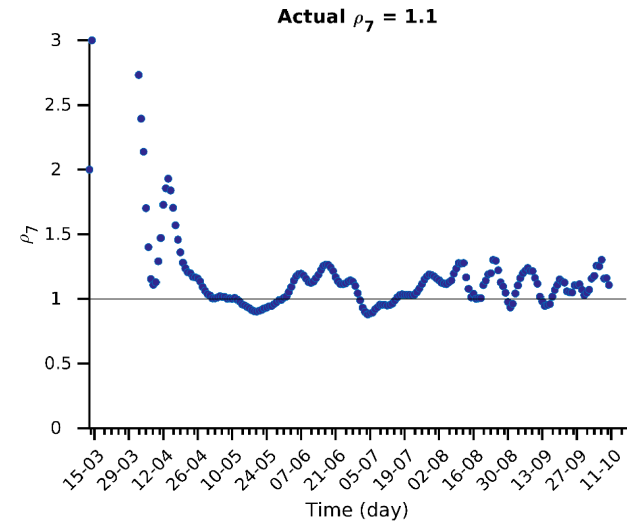
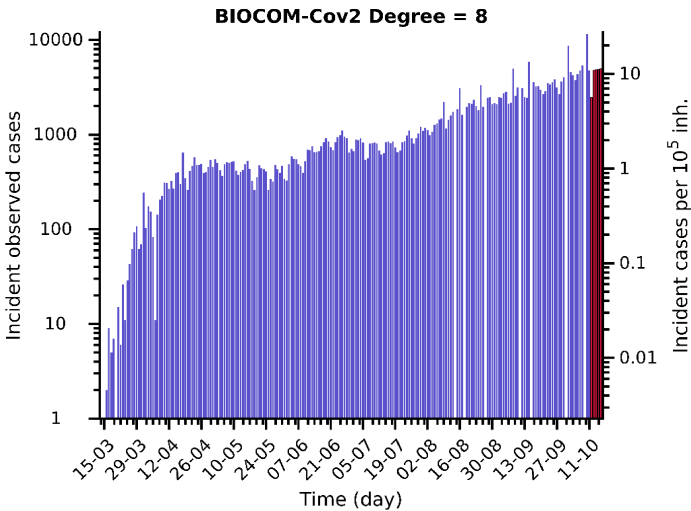
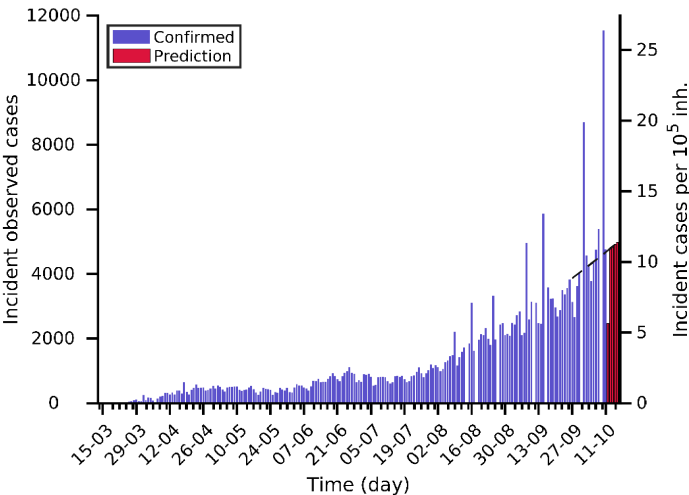


Ukraine 11-10-2020. Pop: 43.7M. Cumulative incidence: 597/10⁵

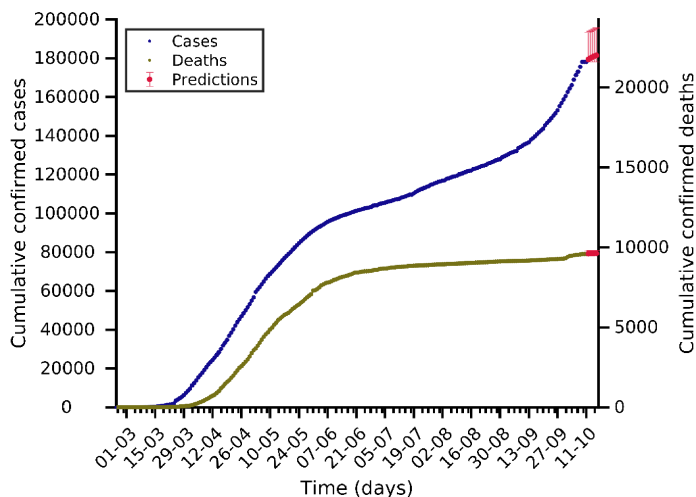


| Predictions for next days | | |
|---------------------------|-----------------|-------------------------|
| Day | Number of cases | 95% Confidence Interval |
| 12-10-2020 | 263503 (+2469) | [261034 - 311968] |
| 14-10-2020 | 273152 (+4854) | [261034 - 323816] |
| 16-10-2020 | 283043 (+4976) | [261034 - 338684] |

| Current indicators | | |
|--------------------|-----|--------|
| A ₁₄ | EPG | CFR |
| 143 | 158 | 2.55 % |



Canada 11-10-2020. Pop: 37.7M. Cumulative incidence: 472/10⁵

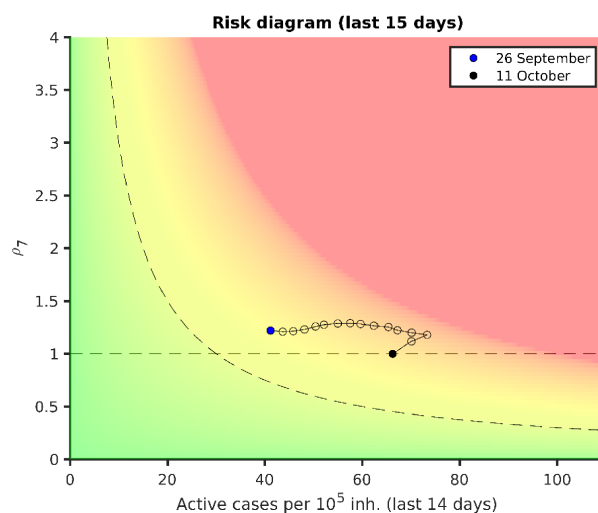
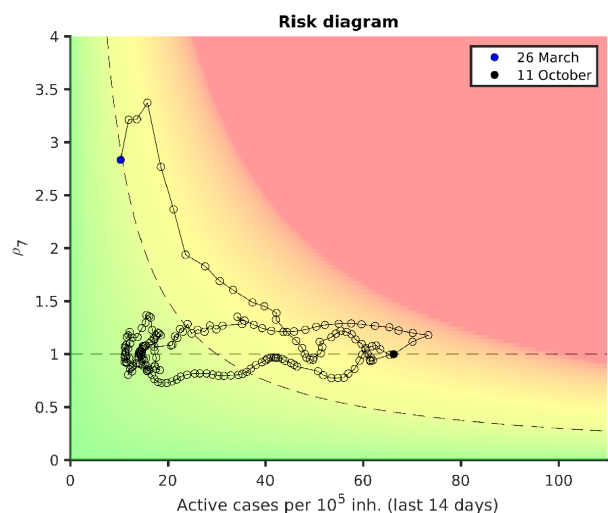
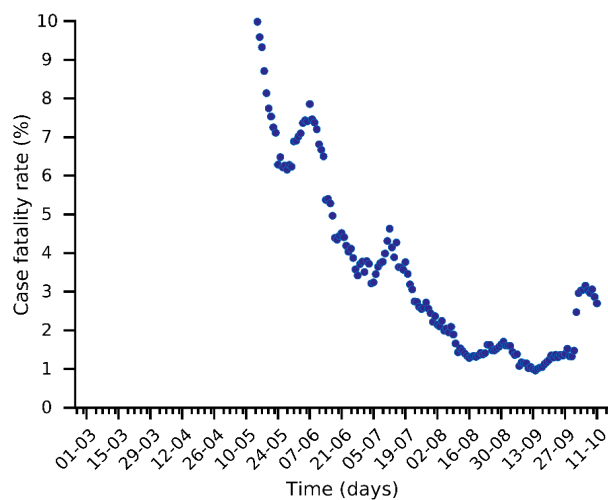
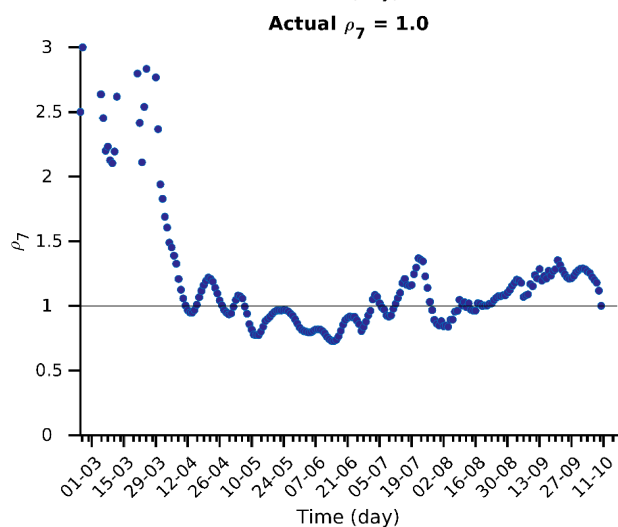
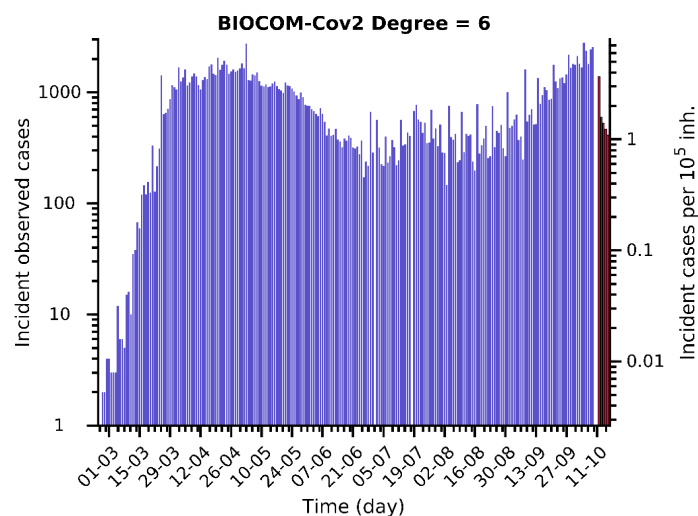
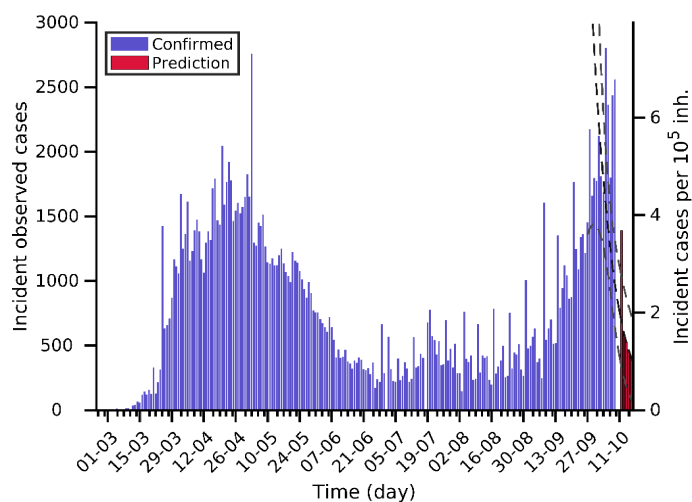


Predictions for next days

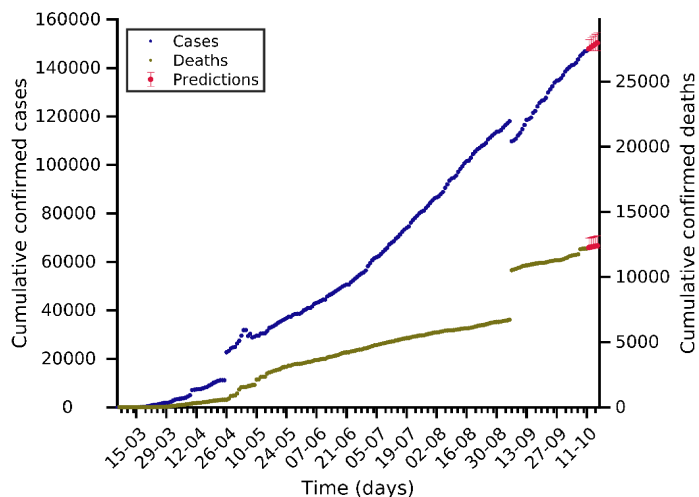
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 179506 (+1389) | [178117 - 193202] |
| 14-10-2020 | 180634 (+529) | [178117 - 194523] |
| 16-10-2020 | 181514 (+413) | [178117 - 195684] |

Current indicators

| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 66 | 66 | 2.70 % |



Ecuador 11-10-2020. Pop: 17.6M. Cumulative incidence: 833/10⁵

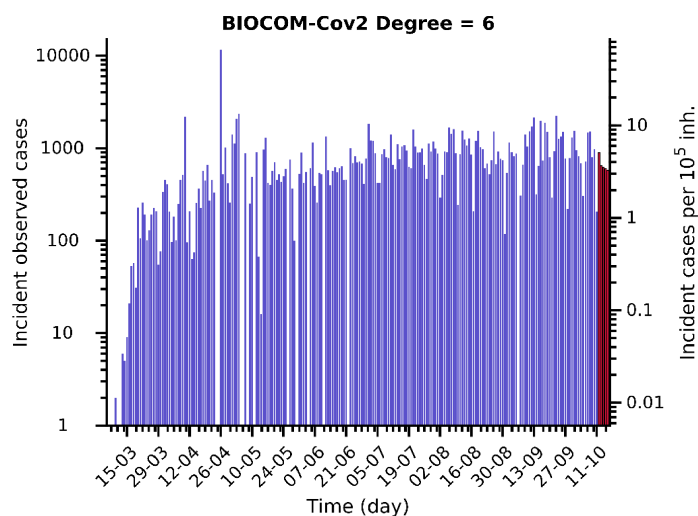
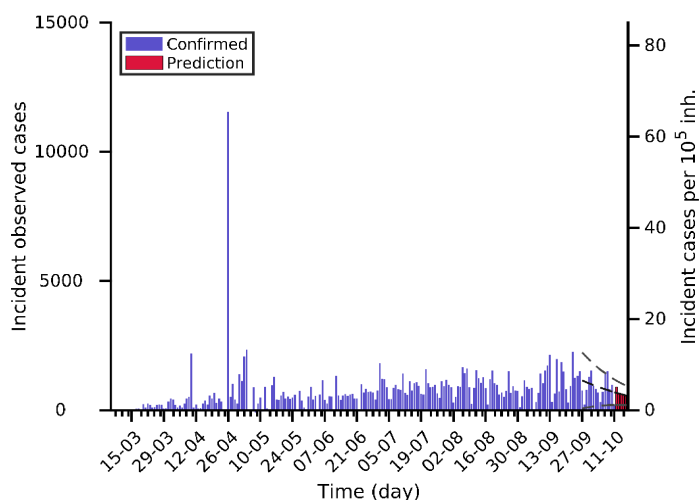


Predictions for next days

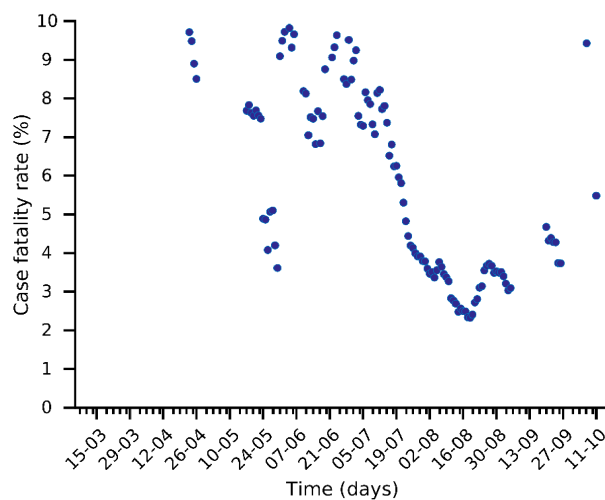
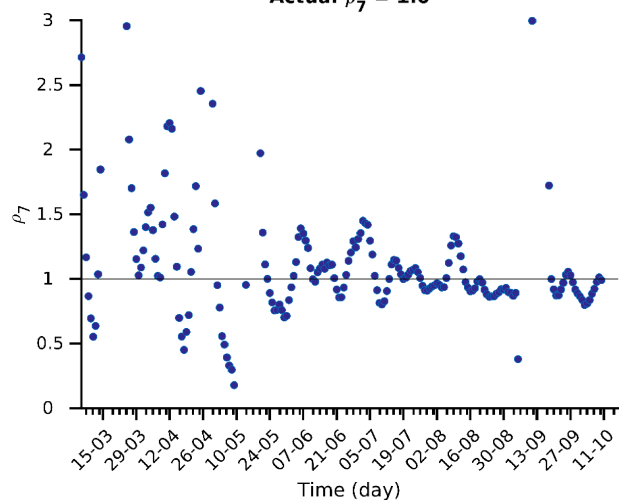
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 147929 (+896) | [147033 - 151786] |
| 14-10-2020 | 149199 (+623) | [147033 - 153169] |
| 16-10-2020 | 150376 (+577) | [147033 - 154560] |

Current indicators

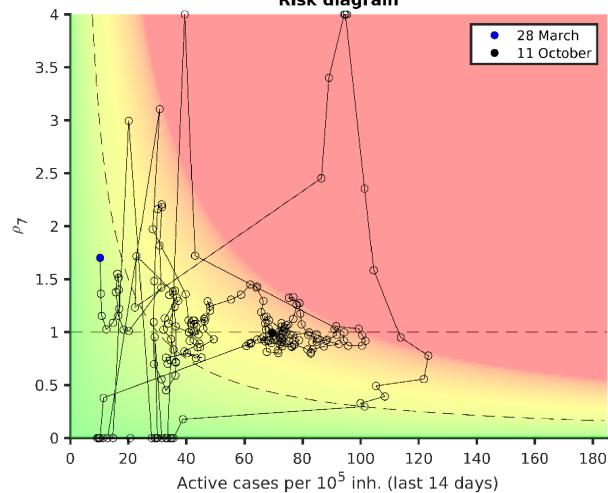
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 70 | 69 | 5.48 % |



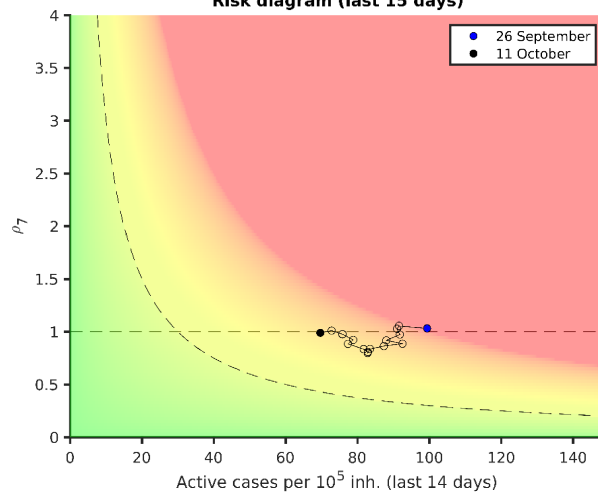
Actual $\rho_7 = 1.0$



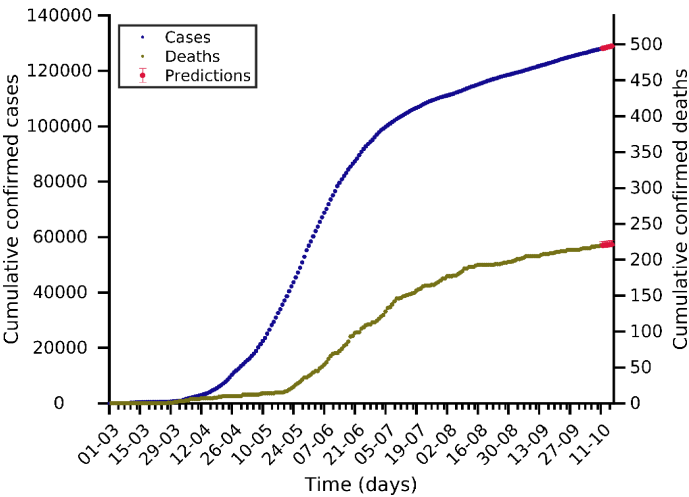
Risk diagram



Risk diagram (last 15 days)

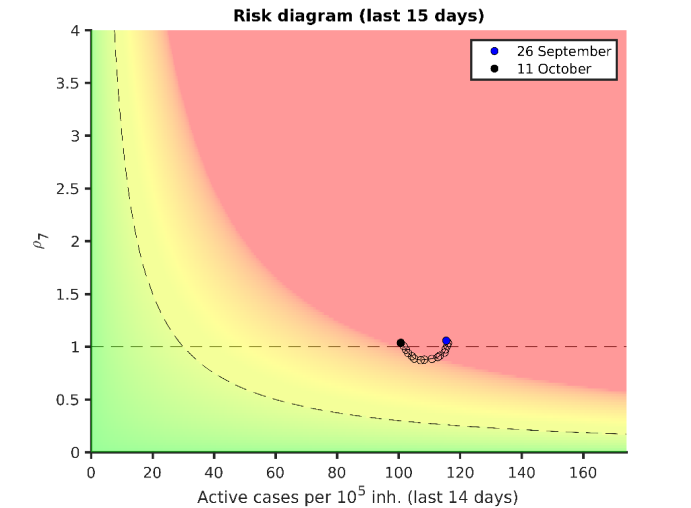
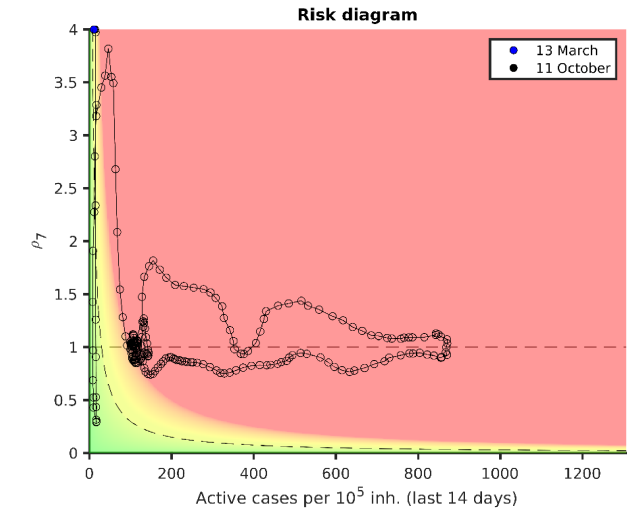
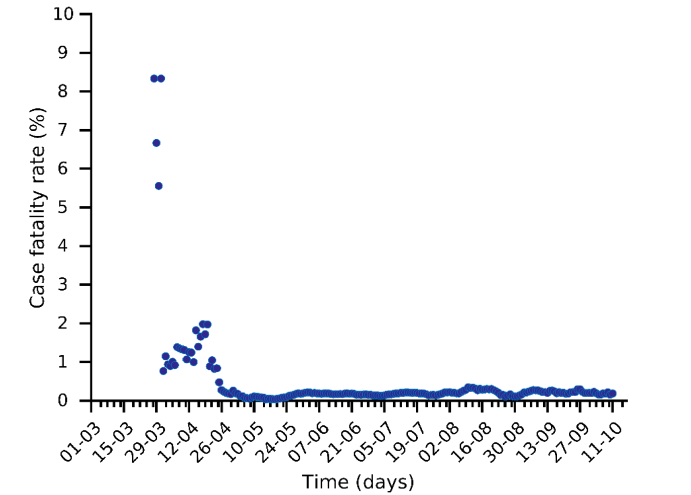
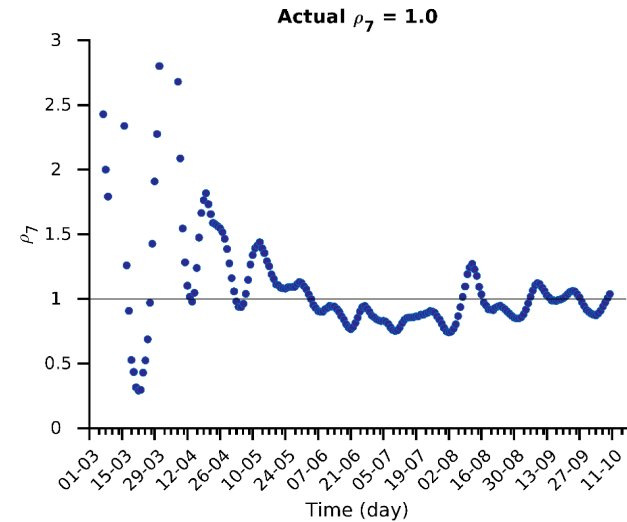
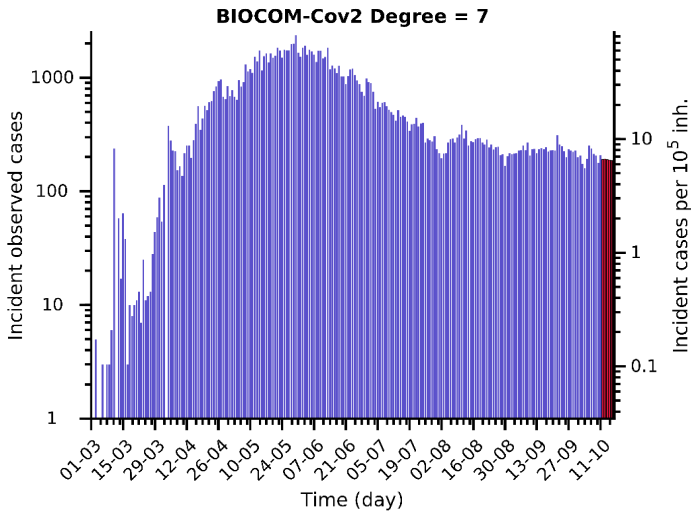
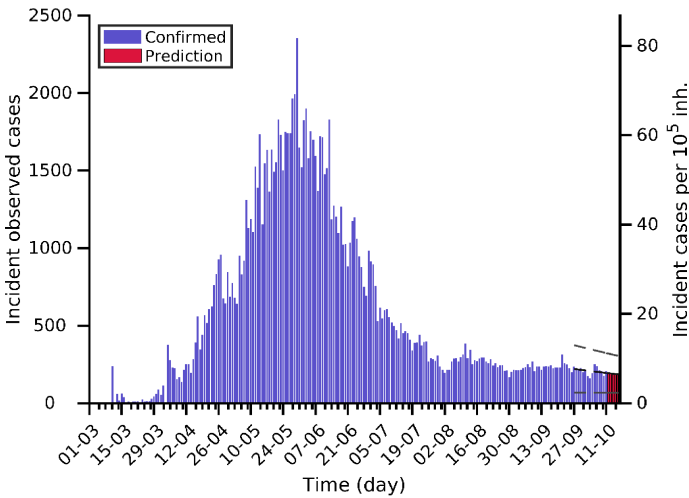


Qatar 11-10-2020. Pop: 2.9M. Cumulative incidence: 4442/10⁵

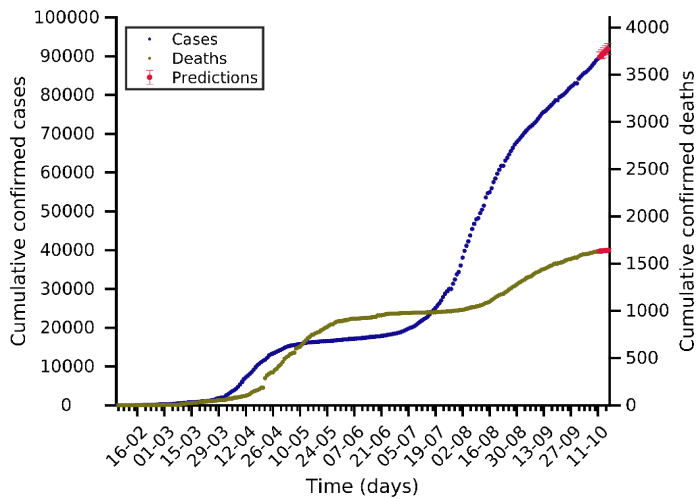


| Predictions for next days | | |
|---------------------------|-----------------|-------------------------|
| Day | Number of cases | 95% Confidence Interval |
| 12-10-2020 | 128176 (+191) | [128012 - 128340] |
| 14-10-2020 | 128558 (+190) | [128388 - 128728] |
| 16-10-2020 | 128933 (+187) | [128750 - 129115] |

| Current indicators | | |
|--------------------|-----|--------|
| A ₁₄ | EPG | CFR |
| 101 | 104 | 0.18 % |



Japan 11-10-2020. Pop: 126.5M. Cumulative incidence: 71/10⁵

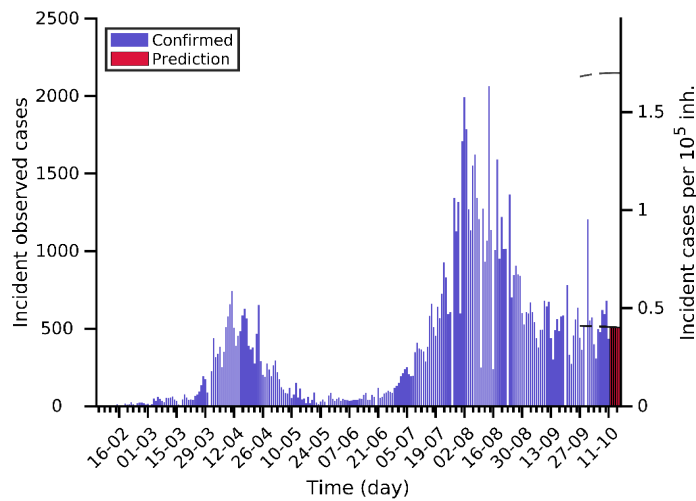


Predictions for next days

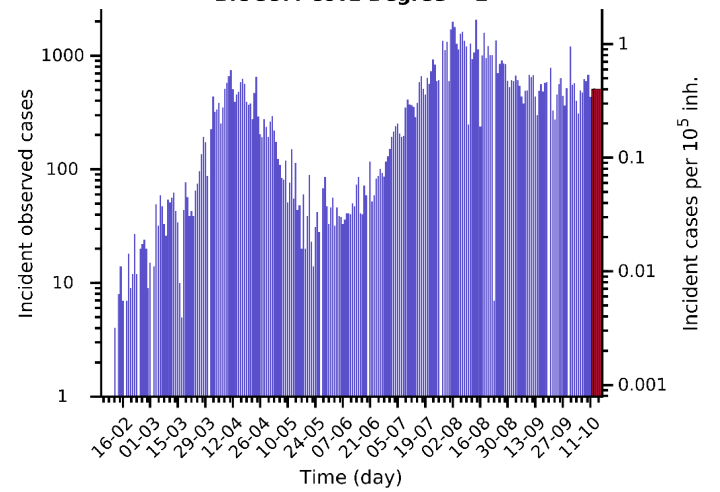
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 89852 (+505) | [89347 - 91081] |
| 14-10-2020 | 90872 (+510) | [89595 - 92149] |
| 16-10-2020 | 91889 (+508) | [90509 - 93268] |

Current indicators

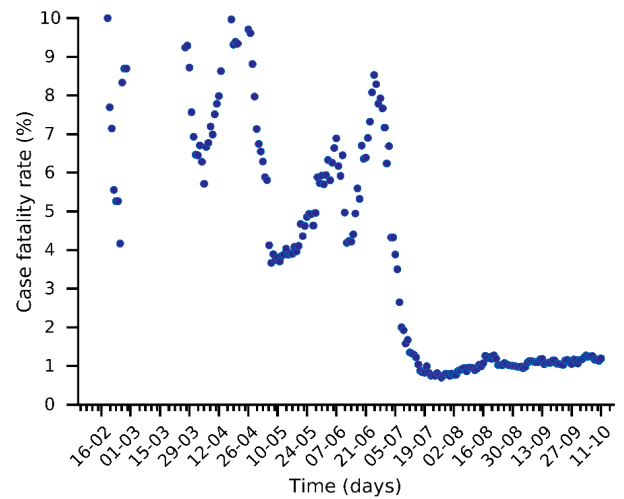
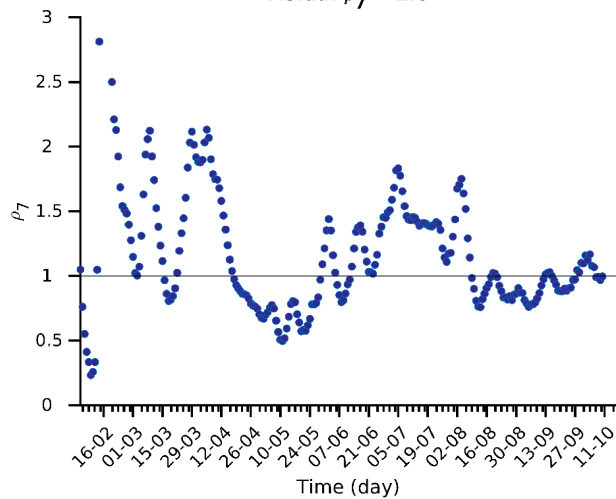
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 6 | 6 | 1.19 % |



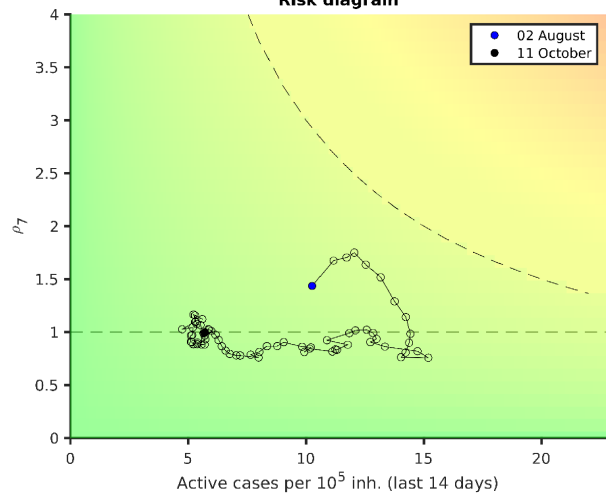
BIOCOM-Cov2 Degree = 2



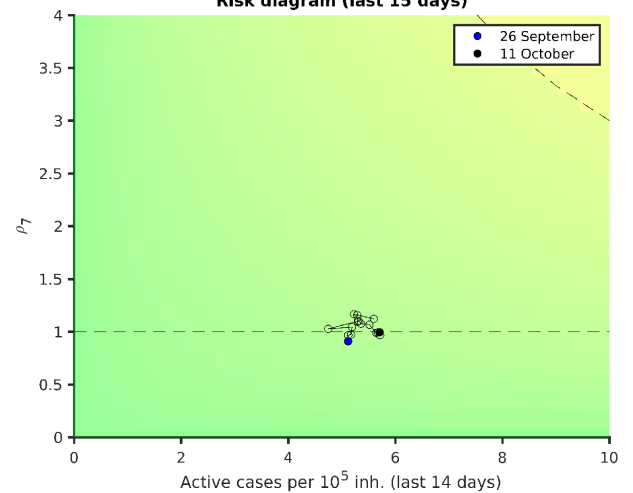
Actual $\rho_7 = 1.0$



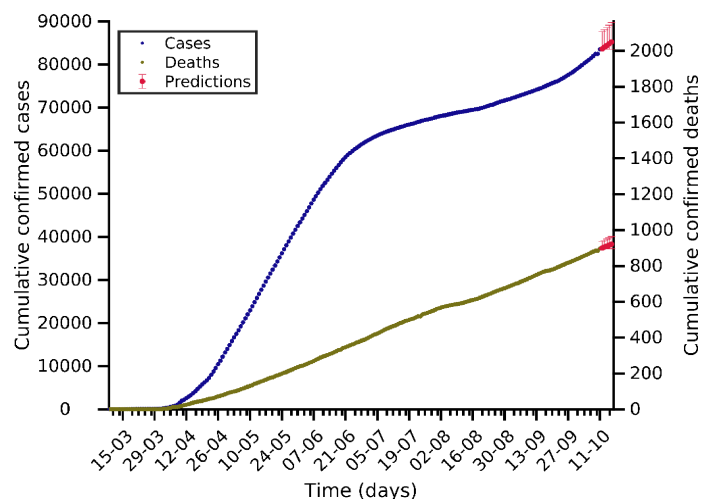
Risk diagram



Risk diagram (last 15 days)



Belarus 11-10-2020. Pop: 9.4M. Cumulative incidence: 884/10⁵

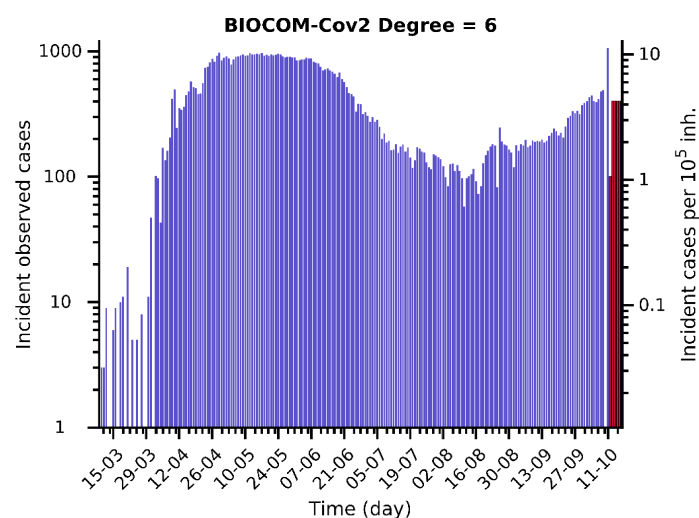
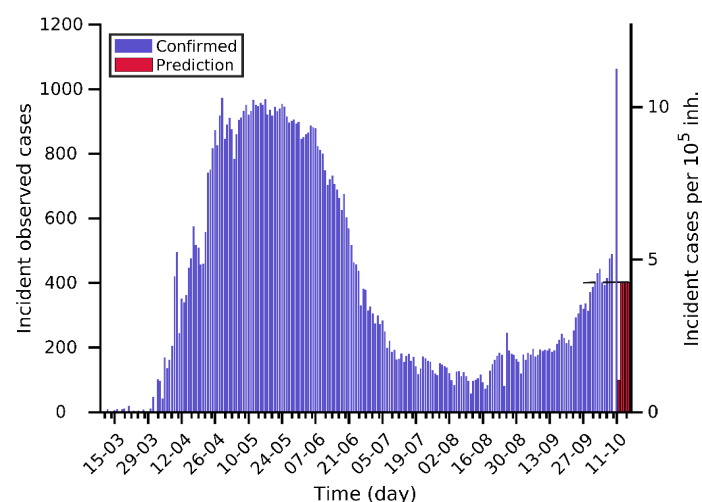


Predictions for next days

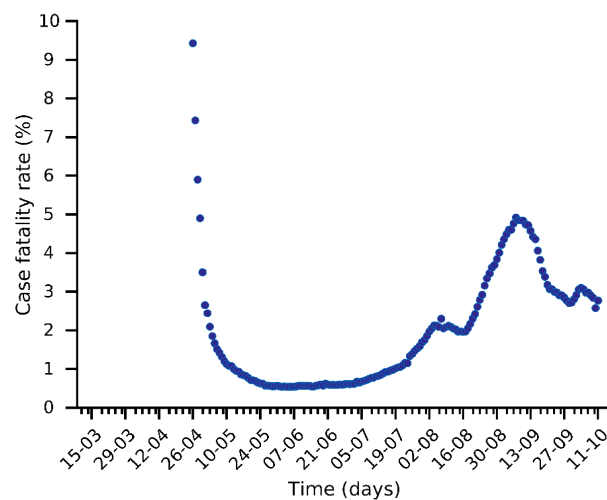
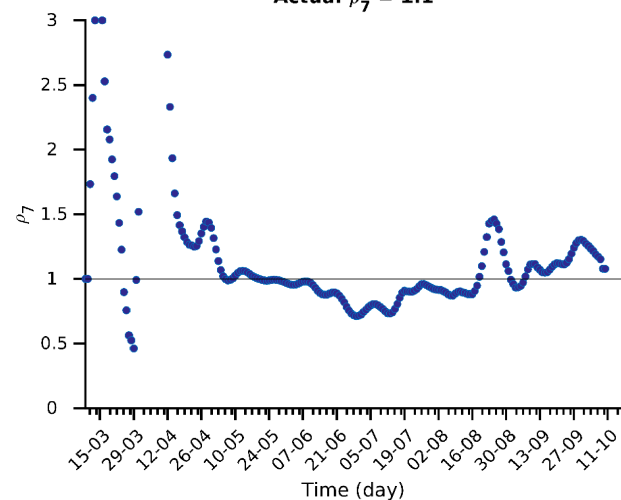
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 83634 (+100) | [83534 - 87633] |
| 14-10-2020 | 84439 (+402) | [83534 - 88595] |
| 16-10-2020 | 85244 (+403) | [83534 - 89737] |

Current indicators

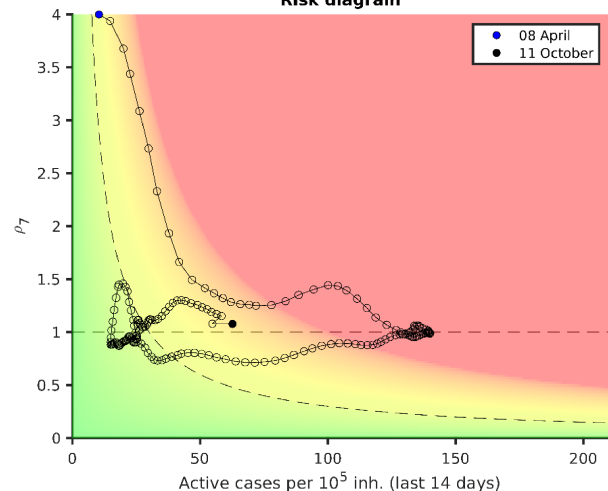
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 63 | 68 | 2.77 % |



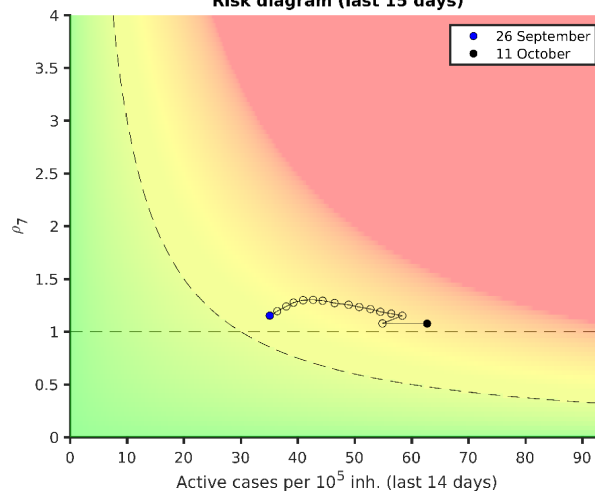
Actual $\rho_7 = 1.1$



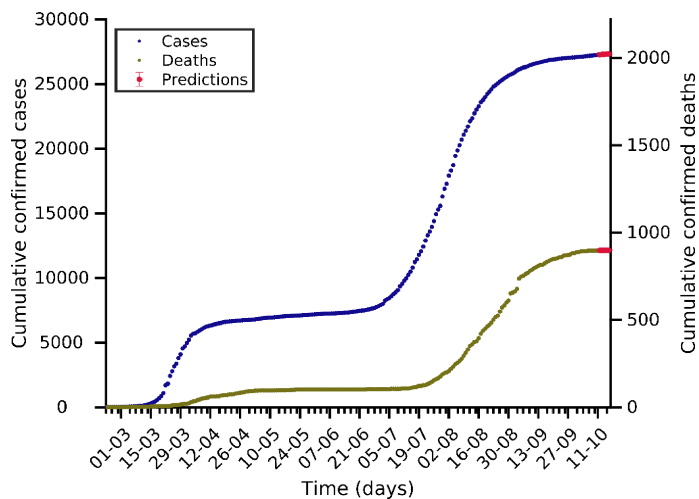
Risk diagram



Risk diagram (last 15 days)



Australia 11-10-2020. Pop: 25.5M. Cumulative incidence: 107/10⁵

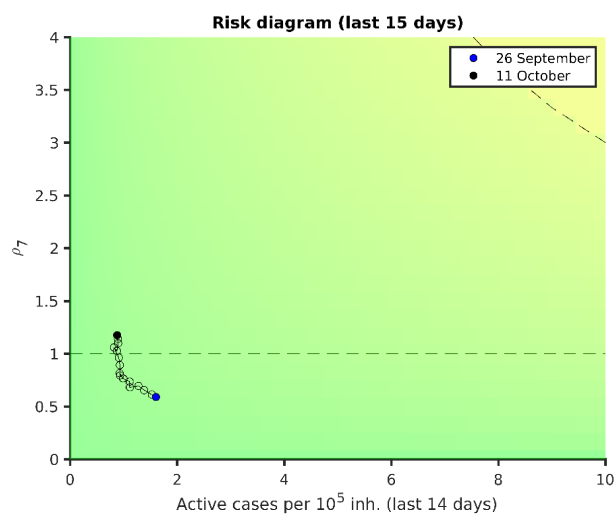
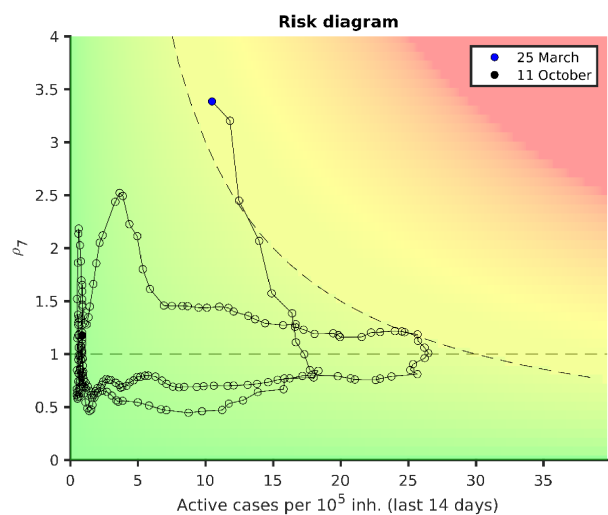
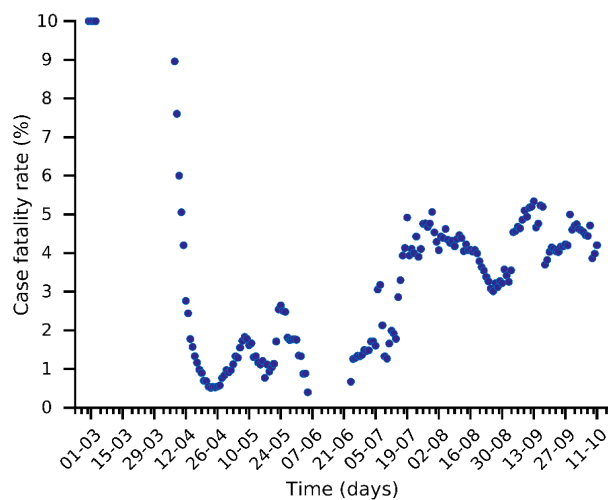
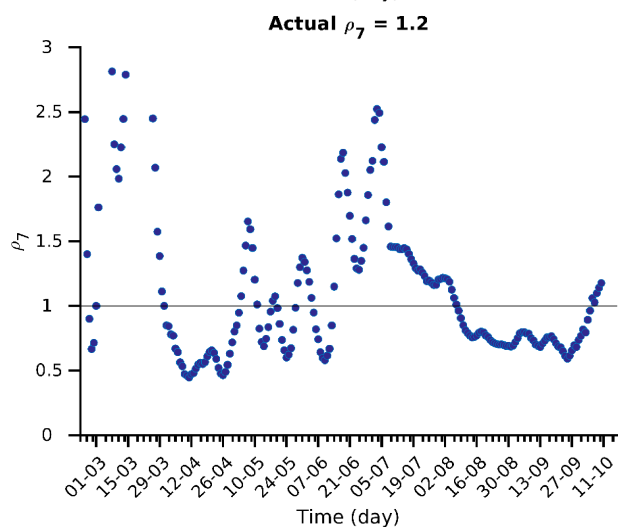
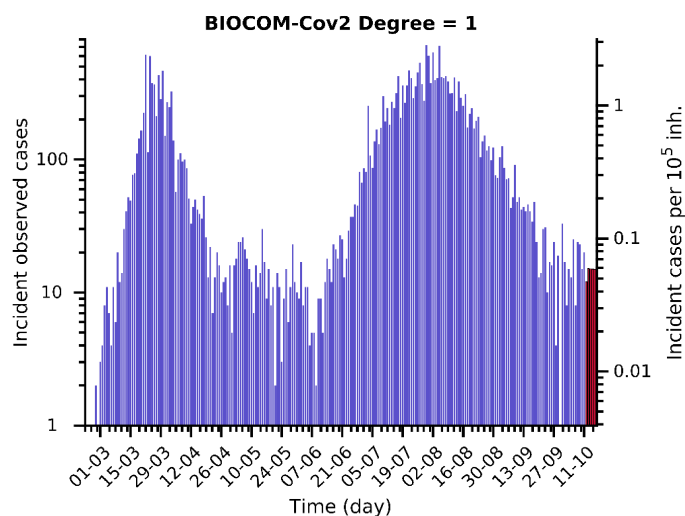
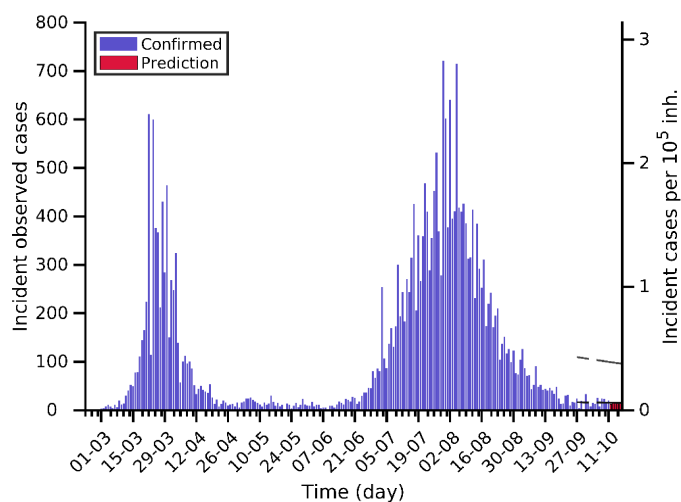


Predictions for next days

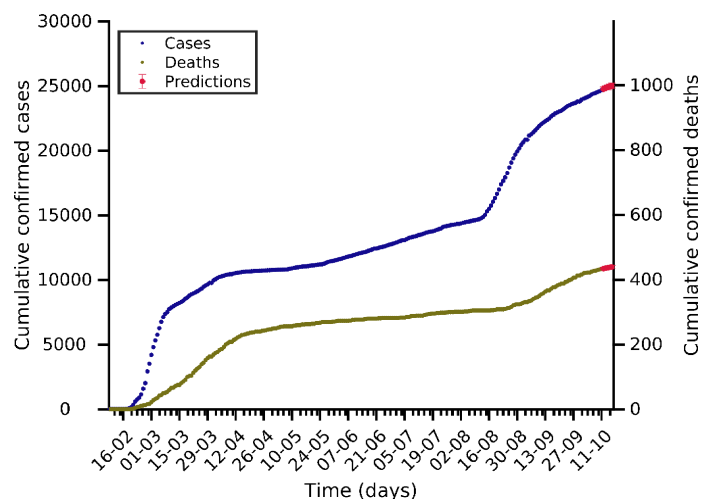
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 27276 (+12) | [27264 - 27328] |
| 14-10-2020 | 27306 (+15) | [27264 - 27360] |
| 16-10-2020 | 27336 (+15) | [27279 - 27394] |

Current indicators

| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 1 | 1 | 4.20 % |



South Korea 11-10-2020. Pop: 51.3M. Cumulative incidence: 48/10⁵

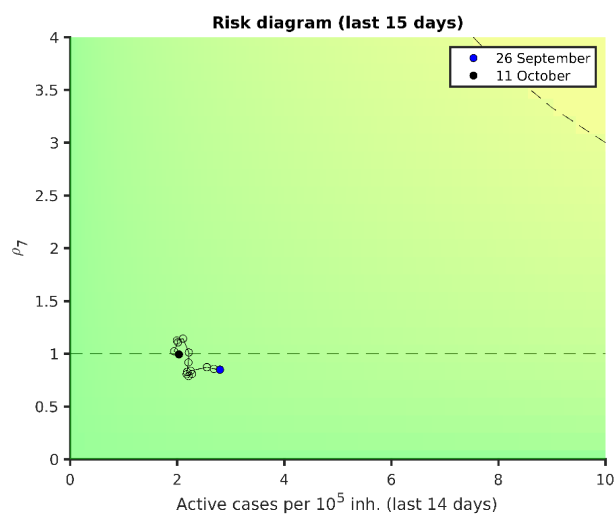
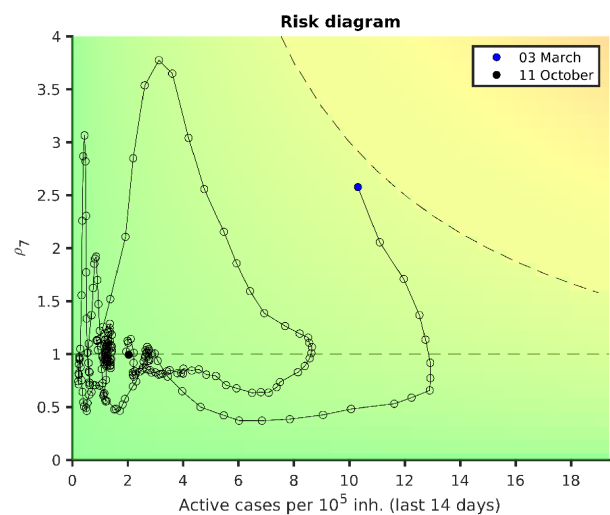
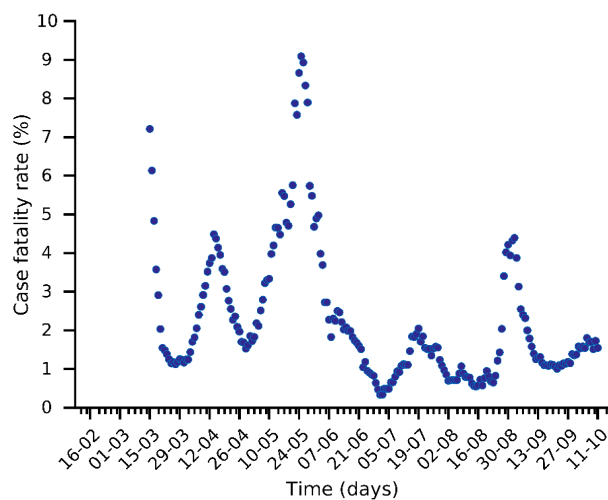
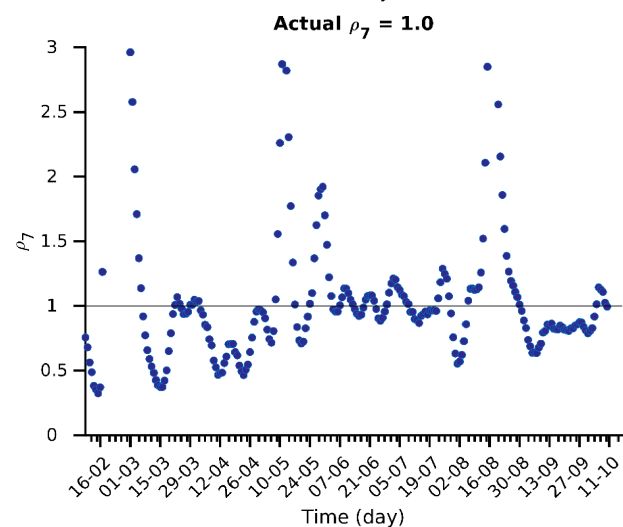
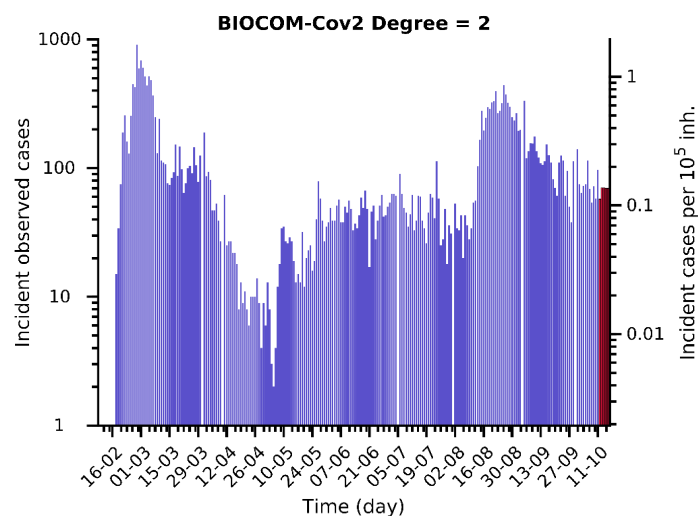
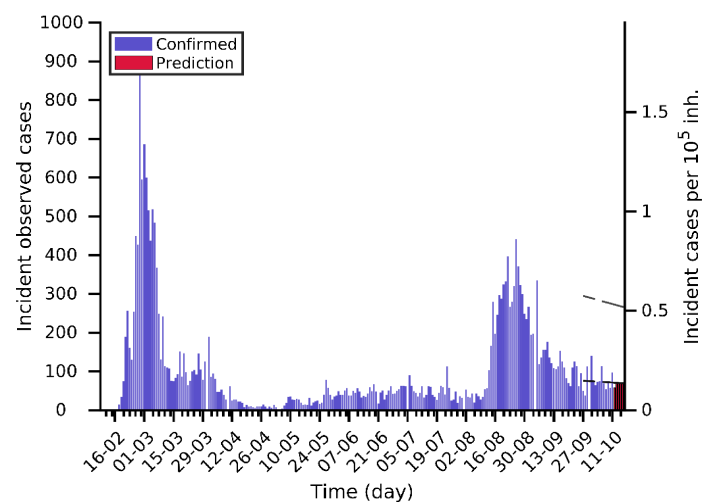


Predictions for next days

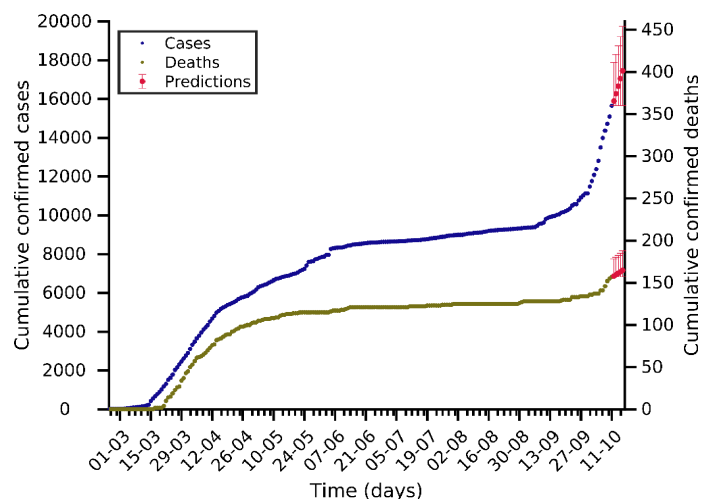
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 24761 (+58) | [24703 - 24935] |
| 14-10-2020 | 24901 (+70) | [24721 - 25082] |
| 16-10-2020 | 25041 (+70) | [24847 - 25235] |

Current indicators

| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 2 | 2 | 1.54 % |



Malaysia 11-10-2020. Pop: 32.4M. Cumulative incidence: 48/10⁵

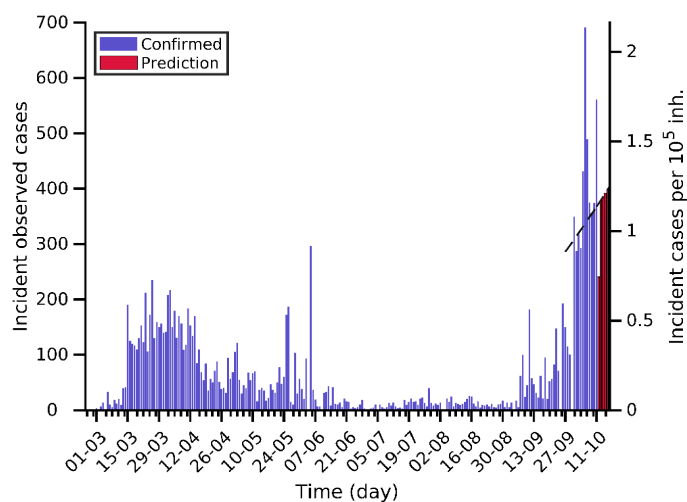


Predictions for next days

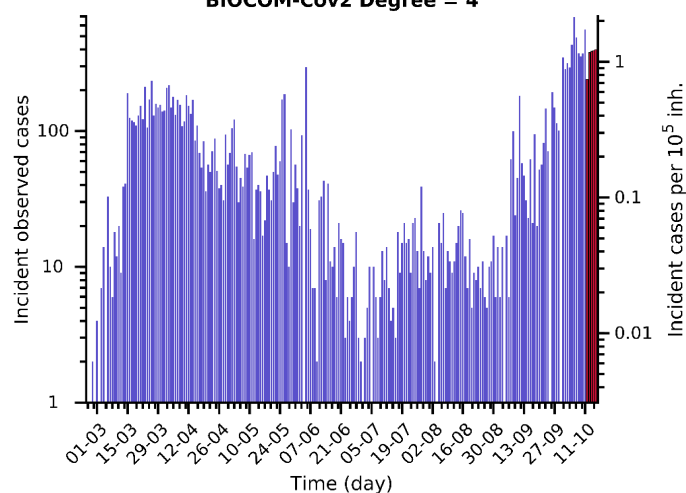
| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 15898 (+241) | [15657 - 17881] |
| 14-10-2020 | 16663 (+386) | [15657 - 18741] |
| 16-10-2020 | 17454 (+398) | [15657 - 19749] |

Current indicators

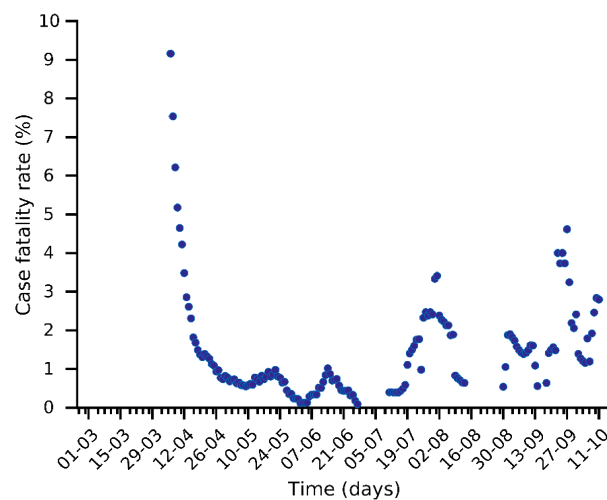
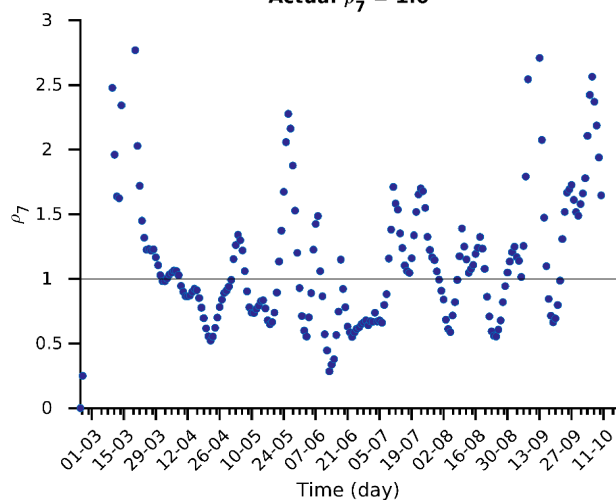
| A ₁₄ | EPG | CFR |
|-----------------|-----|--------|
| 15 | 24 | 2.80 % |



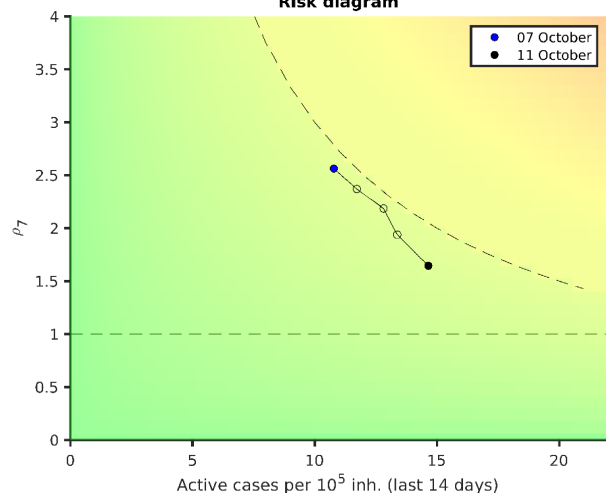
BIOCOM-Cov2 Degree = 4



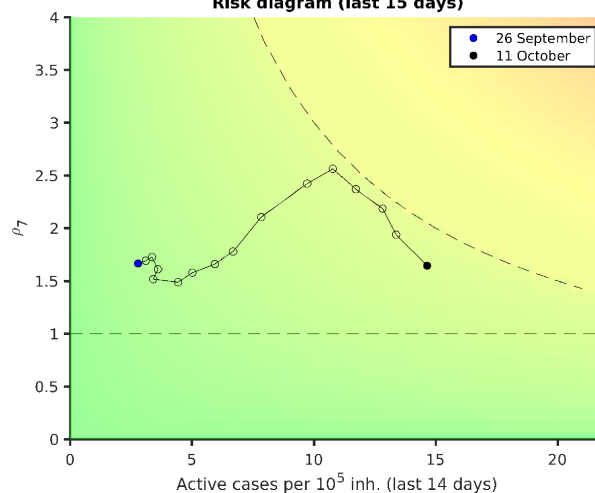
Actual $\rho_7 = 1.6$



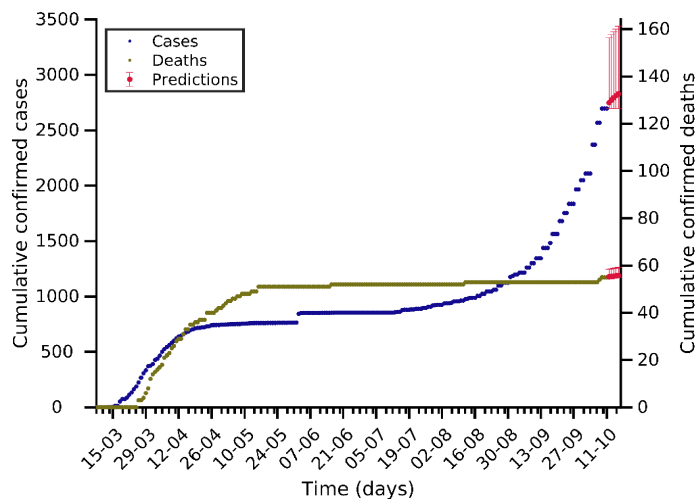
Risk diagram



Risk diagram (last 15 days)



Andorra 11-10-2020. Pop: 0.1M. Cumulative incidence: 3489/10⁵

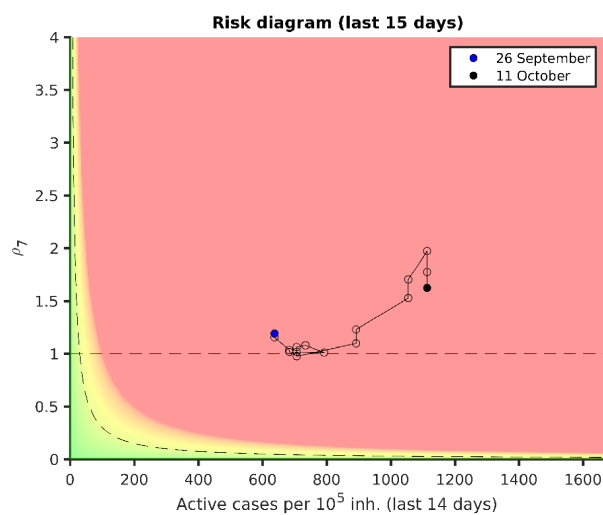
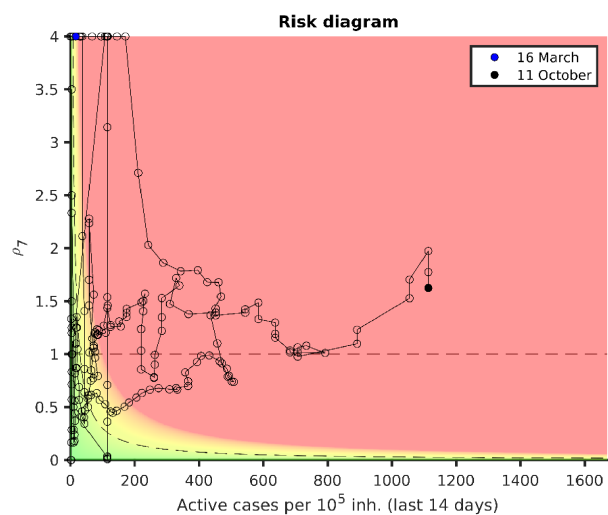
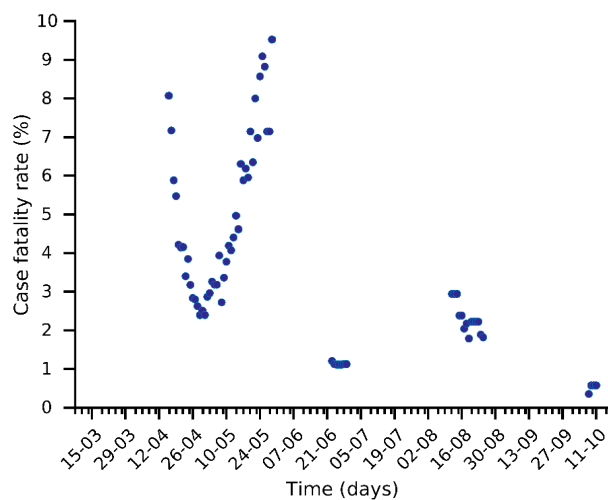
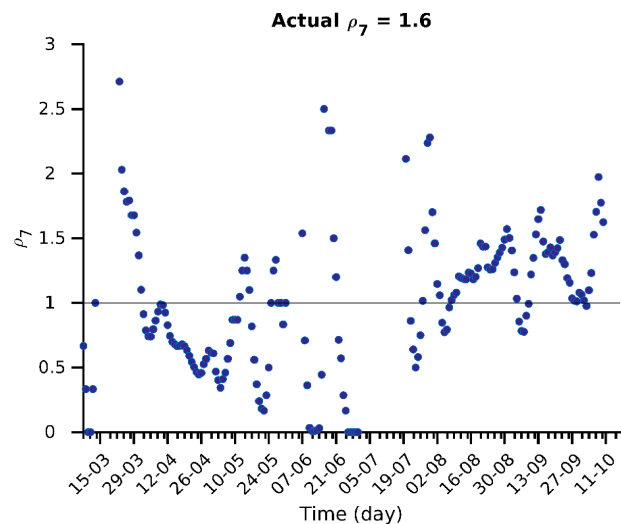
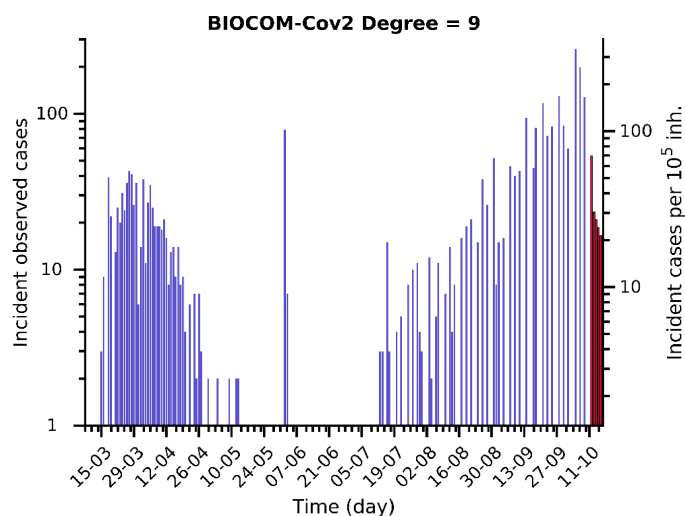
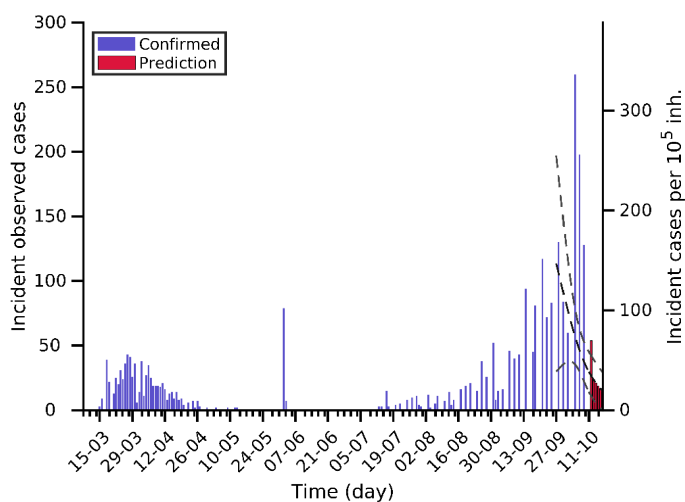


Predictions for next days

| Day | Number of cases | 95% Confidence Interval |
|------------|-----------------|-------------------------|
| 12-10-2020 | 2750 (+54) | [2696 - 3335] |
| 14-10-2020 | 2794 (+21) | [2696 - 3389] |
| 16-10-2020 | 2829 (+16) | [2696 - 3438] |

Current indicators

| A ₁₄ | EPG | CFR |
|-----------------|------|--------|
| 1113 | 1808 | 0.57 % |



Methods

Methods

(1) Data source

Data are daily obtained from European Centre for Disease Prevention and Control (ECDC)⁴ and country official sources (when indicated). Daily data comprise, among others: total confirmed cases, total confirmed new cases, total deaths, total new deaths. It must be considered that the report is always providing data from previous day. In the document we use the date at which the datapoint is assumed to belong, i.e., report from 15/03/2020 is giving data from 14/03/2020, the latter being used in the subsequent analysis.

(2) Data processing and plotting

Data are initially processed with Matlab in order to update timeseries, i.e., last datapoints are added to historical sequences. These timeseries are plotted for individual countries and for the UE+EFTA+UK as a whole:

- ✓ Number of cumulative confirmed cases
- ✓ Number of reported new cases
- ✓ Number of cumulative deaths

Then, two indicators are calculated and plotted, too:

- ✓ Case fatality rate: number of cumulative deaths divided by the number of cumulative confirmed cases, and reported as a percentage; it is an indirect indicator of the diagnostic level.
- ✓ ρ : this variable is related with the reproduction number, i.e., with the number of new infections caused by a single case. It is evaluated as follows for the day before last report ($t-1$):

$$\rho(t-1) = \frac{N_{new}(t) + N_{new}(t-1) + N_{new}(t-2)}{N_{new}(t-5) + N_{new}(t-6) + N_{new}(t-7)}$$

where $N_{new}(t)$ is the number of new confirmed cases at day t after applying a 7-day moving average to the new cases dataset, so that fluctuations (e.g., weekend effect) are smoothed.

(3) Classification of countries according to their epidemic level: the scale Biocom-Cov

Countries are assigned a degree in the discrete Biocom-Cov scale, which aims to facilitate a simple way of assessing the situation of the country. It is based on the level of daily new cases per 100,000 inhabitants as follows:

| Pandemic degree | Daily new incident cases per 10 ⁵ inh. |
|-----------------|---|
| 0 | 0 |
| 1 | 0-0.1 |
| 2 | 0.1-0.5 |
| 3 | 0.5-1.25 |
| 4 | 1.25-2 |
| 5 | 2-3 |
| 6 | 3-5 |
| 7 | 5-8 |
| 8 | 8-14 |
| 9 | >14 |

⁴ <https://www.ecdc.europa.eu/en/geographical-distribution-2019-ncov-cases>

(4) Fitting a mathematical model to data

Previous studies have shown that Gompertz model⁵ correctly describes the Covid-19 epidemic in all analysed countries. It is an empirical model that starts with an exponential growth but that gradually decreases its specific growth rate. Therefore, it is adequate for describing an epidemic wave that is characterized by an initial exponential growth but a progressive decrease in spreading velocity provided that appropriate control measures are applied. Once in the tail, predictions work but the meaning of parameters is lost.

Gompertz model is described by the equation:

$$N(t) = K e^{-\ln\left(\frac{K}{N_0}\right) \cdot e^{-a \cdot (t-t_0)}}$$

where $N(t)$ is the cumulated number of confirmed cases at t (in days), and N_0 is the number of cumulated cases the day at day t_0 . The model has two parameters:

- ✓ a is the velocity at which specific spreading rate is slowing down;
- ✓ K is the expected final number of cumulated cases at the end of the epidemic.

This model is fitted to reported cumulative cases of the UE and of countries that accomplish two criteria: 4 or more consecutive days with more than 100 cumulated cases, and at least one datapoint over 200 cases. Day t_0 is chosen as that one at which $N(t)$ overpasses 100 cases. If more than 15 datapoints that accomplish the stated criteria are available, only the last 15 points are used. The fitting is done using Matlab's Curve Fitting package with Nonlinear Least Squares method, which also provides confidence intervals of fitted parameters (a and K) and the R^2 of the fitting. At the initial stages the dynamics is exponential and K cannot be correctly evaluated. In fact, at this stage the most relevant parameter is a .

It is worth to mention that the simplicity of this model and the lack of previous assumptions about the Covid-19 behaviour make it appropriate for universal use, i.e., it can be fitted to any country independently of its socioeconomic context and control strategy. Then, the model is capable of quantifying the observed dynamics in an objective and standard manner and predicting short-term tendencies.

(5) Using the model for predicting short-term tendencies

The model is finally used for a short-term prediction of the evolution of the cumulated number of cases (3-5 days). The confidence interval of predictions is assessed with the Matlab function `predint`, with a 99% confidence level. These predictions are shown in the plots as red dots with corresponding error bar. For series longer than 9 timepoints, last 3 points are weighted in the fitting so that changes in tendencies are well captured by the model.

(6) Estimating non-diagnosed cases

Lethality of Covid-19 has been estimated at around 1 % for Republic of Korea and the Diamond Princess cruise. Besides, median duration of viral shedding after Covid-19 onset has been estimated at 18.5 days for non-survivors⁶ in a retrospective study in Wuhan. These data allow for an estimation of total number of cases, considering that the number of deaths at certain moment should be about 1 % of total cases 18.5 days before. This is valid for estimating cases of countries at stage II, since in stage I the deaths would be mostly

⁵ Madden LV. Quantification of disease progression. *Protection Ecology* 1980; **2**: 159-176.

⁶ Zhou et al., 2020. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *The Lancet*; March 9, doi: 10.1016/S0140-6736(20)30566-3

due to the incidence at the country from which they were imported. We establish a threshold of 50 reported cases before starting this estimation.

Reported deaths are passed through a moving average filter of 5 points in order to smooth tendencies. Then, the corresponding number of cases is found assuming the 1 % lethality. Finally, these cases are distributed between 18 and 19 days before each one.